EMOTIONAL PROCESSING IN CHILDBIRTH

A longitudinal study of women's management of emotions during pregnancy and the association with postnatal depression

By

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ABSTRACT

Emotional processing in childbirth: A longitudinal study of women's management of emotions during pregnancy and the association with postnatal depression.

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Background: Childbirth is popularly considered to be a time of happiness and fulfilment, yet many authors have reported that women express more negative feelings, including anxiety, apprehension, self-doubt and guilt requiring significant emotional and psychological adaptations during pregnancy and postpartum than at other times in their lives. Yet, despite evidence of emotional stresses challenging women in the perinatal period, one largely unexplored factor is how the management of this complex range of emotions impacts on maternal psychological health.

If managed inappropriately emotions evoked by stressful events will intrude on the maintenance of everyday behaviour. The Emotional Processing Scale (EPS), a tool developed to measure the management of emotions and validated in a variety of countries worldwide, identifies poor processing. To understand maternal emotions more fully this study has used the EPS to explore relationships between emotional processing during the life-changing events of pregnancy and birth and the emergence of postnatal depression.

Aims: The study aimed to examine the relationship between the way women managed their emotions during pregnancy, as measured on the EPS and the development of postnatal depression, as measured on the Edinburgh Postnatal Depression Scale (EPDS). It also investigated the possibility of predicting

postnatal depression from scores on the EPS in conjunction with other recognised risk factors.

Methods: A cohort of 974 pregnant women, aged 16 to 44, from the South of England were surveyed at 13 and 34 weeks gestation and 6 weeks postpartum. In addition to demographic information, standardised measures included the EPS, the Edinburgh Postnatal Depression Scale, the Short –Form 36 and the Rosenberg Self-Esteem Scale. Data were analysed using a variety of univariate and multivariate techniques to investigate the inter-relationships between these variables. Multiple and logistic regression models were built to determine which variables measured during pregnancy best predicted postnatal depression.

Findings: Strong associations were found between poor emotional processing and the likelihood of developing postnatal depression. After adjusting for other recognised and established risk factors for depression, poor emotional processing in early and late pregnancy made a strong unique contribution to the prediction of postnatal depression and the odds of women with a high EPS scores in early and late pregnancy developing depression postpartum were 2.5 and 3.4 times greater than women with low EPS scores.

Implications: There is a need for professionals to have a greater understanding of emotional processing. It is easily measured, and integration of emotions assessment together with supportive measures to facilitate women to manage their emotions more effectively into the existing framework of antenatal care could enable the strategy to be undertaken in a resource-efficient way. This could benefit families who might suffer from the detrimental impact of maternal perinatal emotional and psychological disturbances.

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INTRODUCTION

My interest in undertaking this study arose from a presentation of the concept of emotional processing and the Emotional Processing Scale which I attended. Pregnancy and childbirth can invoke a complex range of positive and negative emotions in women. The notion that the way these emotions are managed might be accurately measured was thought-provoking and fit well with the interest in perinatal psychological wellbeing.

Motherhood is promoted in the media as a time of great joy, fulfilment and satisfaction, which for most women it is. However, for some the role of motherhood is also accompanied by anxiety, apprehension, self-doubt and depression, all of which require significant psychological adaptations. Many authors internationally have reported the wide range of emotions experienced by women in pregnancy and throughout their adaptation to motherhood (Barclay et al. 1997; Mercer 2004; Choi et al. 2005; Wilkins 2006; John 2009). Theses include expectations of motherhood, which are often unmet (Nicolson 2001) and the effects that maternal emotional disturbances can have on the course of a pregnancy and subsequent development of the infant and older child (Hedegaard et al. 1993; Murray and Cooper 1996; Sinclair and Murray 1998; O'Connor et al. 2002). Despite these overwhelming emotional stresses challenging women in the perinatal period few studies have explored the impact that the management of these emotions might have on future maternal psychological health.

I therefore welcomed the opportunity to explore women's emotions throughout pregnancy and postpartum. It provided an opportunity to develop a body of knowledge in an area much commented on in the literature but seldom explored in depth. The challenge was to identify a pattern of emotional processing occurring over the childbirth continuum in order to determine whether the way in which a woman manages emotions is a fundamental part of her being which remains the same despite the potential stresses of pregnancy and birth, or

whether the processing of these emotions changes with the experiences and events of childbirth.

Undertaking the study provided a further opportunity to determine, through an exploration of women's management of their emotions, whether the process actually predicted the subsequent development of postnatal depression. Understanding of this would present excellent opportunities to develop strategies that might enhance the detection of postnatal depression and aid subsequent management of maternal psychological disturbances.

Organisation of the work presented

The thesis is divided into three parts to accommodate the examination of the literature providing the framework for the study, description of the research design and analysis and presentation of the results with discussion, overall conclusions and implications for practice.

Part One provides a background to the study, and begins by exploring in depth the subject of perinatal mental health, considering incidence, prevalence, risk factors and prediction tools. The section continues by exploring the enormous public health impact of poor mental health on the wellbeing of the mother and her family as well discussing the implications for fetal development and later neonatal, infant and adolescent behaviour and development. This is followed by an exploration of the stresses and emotions experienced by women during pregnancy, birth and in the postnatal period. The section concludes with an examination of concepts related to emotional processing and underpinning the development of the emotional processing scale measurement tool.

Part Two identifies the aims and objectives of the study. It continues with a description of the study design, recruitment, data collection and analysis. The measurement tools used to obtain data (the Emotional Processing Scale, the

Edinburgh Postnatal Depression Scale, The Short Form-36 and the Rosenberg Self –Esteem Scale) are also described and discussed.

Part Three of the thesis presents the results of data analysis. Individual stages of analysis are presented in separate chapters, followed by a chapter which discusses the importance and relevance of the findings and how they fit with current knowledge on the subject. Following that, implications of the findings for current and future clinical practice are discussed suggesting how women can be supported to manage their emotions more effectively within the existing and proposed framework for maternity care. An overall conclusion summarises the key themes and messages arising from the data.

Appendices provide details of the initial literature search undertaken and provide copies of the recruitment documentation (the information leaflet, letters and consent form). The three questionnaires sent to participants form another appendix. Copies of the measurement tools (EPDS, EPS, SF-36, and RSE) are also included together with an explanation of the sub-scales of the EPS. Raw data for the scores on the Edinburgh Postnatal Depression Scale (Cox et al. 1987) and the Emotional Processing Scale (Baker et al. 2010) are appended. A further appendix details additional analysis undertaken to determine changes over time in measurement scale scores and a final appendix provides details of publications and conference presentations associated with this doctoral work.

PART ONE: BACKGROUND AND LITERATURE REVIEW

Introduction

Part One describes the review of the literature on perinatal mental health and emotional processing. The first chapter discusses literature relating to perinatal mental health, incidence, prevalence, risk factors and identification which underpin the subsequent discussion of findings in the current study. The following chapter discusses the importance to public heath and the wellbeing of the family unit of understanding more about women's emotional and psychological wellbeing. It discusses how poor perinatal mental health impacts on the woman and her environment and on the wellbeing of her partner and immediate family. The physical implications for the fetus of anxiety and depression during pregnancy are explored and the longer term developmental impact on the neonate, infant and adolescents are discussed. The final chapter in this section explores a range of emotions that might be experienced by women during pregnancy, birth and postpartum to provide an understanding of the complexities of women's emotional wellbeing at this time, and continues by discussing the literature on emotional processing and associated concepts such as emotional awareness, expression and intelligence to give the reader an understanding of the importance of exploring the management of emotions in relation to childbirth.

1. PERINATAL MENTAL HEALTH

Introduction to chapter

Women in pregnancy and the postpartum period will experience some changes in their psychological wellbeing and mental functioning as a normal response to pregnancy, birth and motherhood, while some women, as a result of their pregnancy, will develop emotional disturbances during pregnancy and postpartum, possibly leading to more serious mental health problems (National Institute for Health and Clinical Excellence [NICE] 2007). For a number of years perinatal mental illness has been a leading cause of maternal morbidity and mortality in the United Kingdom [UK] (Oates 2004; Centre for Maternal and Child Health [CEMACH] 2007; Centre for Maternal and Child Enquiries [CMACE] 2011) which has huge ramifications not only for the wellbeing of the mother but also for partnerships, the developing fetus, neonates, infants and adolescents (Van den Bergh et al. 2005a and 2005b; Glover et al. 2005; Glover and O'Connor 2006). This chapter explores maternal mental health throughout the childbirth continuum. The chapter begins by discussing antenatal and postnatal mental health disorders and continues by looking at the incidence and prevalence of antenatal and postnatal depression. The chapter concludes by considering risk factors for postnatal depression and examining predictive tools that might identify the condition.

1.1 Perinatal mental health disorders

Perinatal mental health disorders range from general anxiety and depression to more serious major psychoses such as bipolar disorder and schizophrenia [often referred to in the postpartum period as puerperal psychosis] (Raynor and England 2010). A number of women will have a pre-existing mental health disorder when they become pregnant, others a history of past mental illness, which may pre-

dispose them to a recurrence during the postnatal period (for example bipolar disorder) or a family history which makes them more vulnerable (Oates 2006). Depression and anxiety are the most common mental health disorders, but others such as panic disorders, obsessive compulsive disorders (OCD) and eating disorders must be identified and managed appropriately during pregnancy to prevent relapse or aggravation of their condition and ramifications on the wellbeing of the mother, fetus and family (NICE 2007). Women with bipolar disorder, characterised by varying episodes of mania and depression, are particularly vulnerable postnatally, with the risk of relapse if untreated being as high as 50%, and specialist perinatal psychiatric management of medication and care is essential to avoid relapse and ensure optimal outcomes for the woman and her baby (NICE 2007). At this time, however, there is lack of evidence to support optimal management of severe mental health disorders in pregnancy and postpartum, with further research needed to compare the efficacy and cost effectiveness of interventions, to evaluate specialist perinatal mental health networks and to aid women with severe mental health conditions to make informed decisions about their care (NICE 2007).

Depressive illness of varying degrees of severity is the most common mental health disorder perinatally (NICE 2007). Signs and symptoms of depression in any population include low mood, irritability, inability to sleep, tiredness and lethargy, appetite changes, hopelessness and lack of interest in self and surroundings (Royal College of Psychiatrists 2000). The variation in presentation of symptoms and the course and outcomes of the disorder have led to a number of theoretical explanations of their aetiology, including biological, genetic, psychological and social factors (NICE 2007).

The Diagnostic and Statistical Manual of Mental Health Disorders, Fourth Edition, Text Revision (DSM-IV), which provides a standard classification of mental disorders used by many professionals, provides criteria for differentiating between major and minor depressive symptoms (American Psychiatric Association 2000). Criteria for major depression includes either depressed mood

or disinterest in everyday activities over a two week period with four other symptoms from a list of weight loss or gain, insomnia or hypersomnia, psychomotor agitation or retardation, fatigue, inability to concentrate, feelings of worthlessness and recurrent thoughts of death. To be diagnosed as a major depressive episode the symptoms must represent a change from normal functioning (American Psychiatric Association 2000). Major depression can be categorised as 'mild', in which there are few symptoms in excess of the minimum criteria, 'moderate', or 'severe', where the depression has a marked impact on social functioning. Minor depression occurs where only a few of the symptoms for major depression exist (American Psychiatric Association 2000).

In addition to major depression the DSM-IV also recognises postpartum depression as a sub-category, and categorisation relates to any mental or behavioural disorder associated with the puerperium and not classified elsewhere (American Psychiatric Association 2000). In order to qualify as postpartum depression, onset must be within one month of giving birth.

Anxiety disorders, often comorbid with depression, may be present in the perinatal period. These disorders range from panic, generalised anxiety disorder (GAD), obsessive compulsive disorder (OCD) or post-traumatic stress disorder (PTSD) (NICE 2007). As there is growing evidence that maternal anxiety may affect fetal growth and development (discussed in Chapter 2) NICE (2007) recommends that more attention should be paid to these disorders when discussing health with pregnant women.

A study of patterns of anxiety across pregnancy and postpartum of 8,323 women in the UK found that not only did antenatal anxiety, as measured on the Crown Crisp Experiential Index (CCEI), a self-rating scale, (Crisp et al. 1978) predict postnatal anxiety but also anxiety in the antenatal period predicted postnatal depression, as identified by a score of 13 or more on the Edinburgh Postnatal Depression Scale (EPDS), at eight weeks even after controlling for antenatal depression (Heron et al. 2004). Consistent with these findings an Australian

study, which assessed postnatal distress (a term suggested by the authors as being more representative of the emotional state of anxiety and depression experienced by women than postnatal depression) among a group of 325 primiparous women found a prevalence of anxiety and stress postpartum, as measured by the Depression, Anxiety and Stress Scales (Lovibond and Lovibond 1995), suggesting that studies of perinatal mental health should focus on broader issues of distress rather than depression (Miller et al. 2006). The authors concluded that concentration on depression rather than anxiety results in the latter being subsumed within a diagnosis of depression and its importance ignored (Miller et al. 2006).

1.2 The incidence and prevalence of antenatal depression

Studies show that maternal emotional disturbance or depression during pregnancy, although not as frequently reported as postnatal depression, is as prevalent, and pregnancy does not afford women protection from mental illness (Evans et al. 2001; Melville et al. 2010; Rubertsson et al. 2003). Indeed, a study of depressed mood during and after childbirth in 14,541 women in the UK found that women had higher depression scores in pregnancy than postnatally as measured by a cut off of 13 and over on the EPDS at 18 and 32 weeks antenatally and eight weeks and eight months postnatally, suggesting that antenatal depression is more common than postnatal depression (Evans et al. 2001). A meta-analysis of 84 international studies published between 1990 and 1999, exploring predictors for postnatal depression as measured predominantly by the EPDS and the Beck Depression Inventory (BDI) has shown that the most significant predictor for postnatal depression is depression in the antenatal period (Beck 2001).

The occurrence of antenatal depression has been associated with a number of factors. Many of these factors, such as personal and family history of depressive disorders, marital conflict, lack of social support and stressful life events,

(Altshuler et al. 1998; Marcus et al. 2003; Rubertsson et al. 2003) apply equally to risks of postnatal depression and will be discussed in detail in following sections. There is, however, evidence that indicates that the type of emotion experienced antenatally may be linked to the stage of pregnancy, feelings being dependent on the impact made on lives by the pregnancy at certain stages. Rofé et al. (1993) suggested that emotional disturbance in the first trimester may be related to physiological changes such as hyperemesis or discomfort, while late pregnancy disturbance is more likely to be related to anxiety about birth. A study of 139 Australian women in the third trimester of pregnancy found that women at 36 weeks gestation complained of high levels of worry and anxiety about their pregnancy, health, relationships and socioeconomic issues (Records and Rice 2007).

A systematic review of 28 prospective and two retrospective international cross-sectional, cohort and case control studies from developed countries, looked at the occurrence of depression at different points in time during the childbirth continuum (Gavin et al. 2005). Measurement tools to determine depression varied among the studies, but a criterion for inclusion was that depression was confirmed by a diagnostic interview or test. The authors produced combined estimates of prevalence and incidence of depression from all the studies. The point prevalence of depression at the end of the first trimester (the percentage of women with depression at that point in time) was 11%, but it dropped in the second and third trimesters to 8.5%. The period prevalence of depression for the whole of pregnancy, (the percentage of women with depression within a period of time), was estimated to be 12.7% for major depression. The incidence of major or minor depression (the percentage of new cases of depressive episodes during pregnancy and within the first year postpartum) was 14.5% during pregnancy and the same during the first three months postpartum. During pregnancy 7.5% of women were found to have had a new episode of major depression and 6.5% during the first three months postpartum. Confidence intervals (CI) surrounding these figures were wide, however, suggesting some uncertainty in these estimates (Gavin et al. 2005).

An earlier systematic review of 714 observational studies and surveys (19,284 women), which also used a variety of measurement tools alongside a clinical diagnosis, suggested a lower prevalence of antenatal depression in the first trimester and higher prevalence in the second and third trimesters than those identified by Gavin et al. (2005); the point prevalence was 7.4% (95% CI 2.2 to 12.6), 12.8% (95% CI 10.7 to 14.8) and 12% (95% CI 7.4 to 16.7) for the first, second and third trimesters respectively (Bennett et al. 2004). In a study of 3,051 women in the United States of America (USA) to determine the prevalence of antenatal mental health problems and risk factors, Witt et al. (2010) reported that the overall period prevalence of antenatal depression was 7.8%, lower than Gavin et al.'s (2005) finding. Data were based on responses to interview questions which were then classified into categories based on the International Classification of Diseases Ninth Revision [ICD-9](Witt et al. 2010).

A more recent longitudinal study of 40,333 Australian women by Milgrom et al. (2008), which explored antenatal risk factors for postpartum depression, also found higher rates of antenatal depression in the second trimester than Gavin et al. (2005) but not as high as Bennett et al. (2004). Using a cut-off of 12 and over on the Edinburgh Postnatal Depression Scale (EPDS) 8.9% of women were identified as having signs of depression at approximately 25 weeks gestation. Evans et al. (2001) in a study of depressed mood during and after childbirth in a cohort of 14,541 women, mentioned earlier, identified higher rates of depression in the second trimester than the aforementioned studies with 13.5% of women displaying signs of depression (identified by a score of 13 or more on the EPDS) at 32 weeks. A longitudinal study of 1,558 Swedish women, examining the prevalence of depressive symptoms in a pregnant and later postnatal population to determine an association between antenatal and postnatal depressive symptomatology, measured depressive symptoms at 35 to 36 weeks gestation using a cut-off of 10 on the EPDS (Josefsson et al. 2001). The authors reported a prevalence of depressive symptoms in late pregnancy of 17.4%, higher than the aforementioned studies. The overall prevalence of antenatal depression in a

cohort of 610 Thai women assessed for depressive mood during pregnancy and postpartum using the same EPDS threshold of 10 was slightly higher than the aforementioned study at 20.5% (Limlomwongse and Liabsuetrakul 2006). The authors found that being unmarried, having a negative attitude towards the pregnancy and having a history of experiencing premenstrual irritable mood doubled the risk of women having a score of 10 or more on the EPDS.

These discrepancies in prevalence rates highlight the importance of knowing what measurement tools was used in each study, whether these were validated for use with pregnant and postnatal women and within the culture in which they were used, the cut-off points of screening tools used to identify depression and if depression was based on clinical diagnosis. Discussion of all these points is beyond the scope of this study (although cut-off points are considered in more details in Chapter 6) but nevertheless the figures reported remain important in highlighting the need for an awareness of antenatal, as well as postpartum mood, when planning the care of women.

Associations between antenatal depression and postpartum depression have been identified internationally (Kumar and Robinson 1984; Josefsson et al. 2001; O'Connor et al. 2002; Kitamura et al. 2006; Oppo et al. 2009). In the UK study by O' Connor et al. (2002) mentioned previously, the authors found that one third of women experiencing antenatal depressive symptoms at 32 weeks (scores of 13 and over on the EPDS) went on develop postnatal depression. Josefsson et al. (2001) found that high antenatal depression scores had a predictive power for postpartum depressive scores, although over half of the antenatal high scorers did not subsequently display symptoms of depression postnatally. They attributed this to the differing aetiology of depression, such that some women experienced high levels of generalised anxiety about the birth which dissipated afterwards. In a population based controlled cohort study conducted in Belgium, Van Bussel et al. (2006) found that a similar number of women suffered depressive symptoms , as assessed by the General Health Questionnaire (GHQ - 12) (Goldberg 1972) during pregnancy (24.7%, n = 80) and after birth (23.5%, n =

76), although emotional disturbances during pregnancy did not predict mental health disorders postpartum.

1.3 The incidence and prevalence of postnatal depression

Postnatal depression is by far the most widely acknowledged perinatal mental health condition, but the NICE recommends caution when using this term as its misuse and incorrect labelling can result in a failure to identify other serious illnesses, sometimes with devastating consequences (NICE 2007).

It is generally quoted that approximately 13% of women experience postnatal depression (O'Hara and Swain 1996). More recent figures are higher, however, ranging from 19.2% (Gavin et al. 2005) to as high as 28% (Scottish Intercollegiate Guidelines Network [SIGN] 2002). It is well documented that symptoms of postnatal depression are largely under-reported by women and under-identified by professionals (Nielsen Forman et al. 2000; Yonkers et al. 2001) and as such the incidence and prevalence are difficult to estimate. Thus because of the wide ranging figures reported, the incidence and prevalence of postpartum depression internationally is best studied by considering systematic reviews of the abundance of research carried out in this area which appraise, select and synthesise the available research evidence.

In a meta-analysis of 59 international studies, containing a total of sample of 12,810 women, O'Hara and Swain (1996) found that the average prevalence of postnatal depression was 13% with a 95% Confidence Interval (CI) of 12.3% to 13.4%,. The meta-analysis, which considered studies that assessed postpartum depression using either self-report measures, such as the EPDS, with consistent thresholds to indicate depression, or a clinical interview, found that the former yielded lower estimates of postpartum depression (12%) than interview methods (14%). Moreover longer postpartum review times yielded higher prevalence estimates than shorter ones. The results were not significantly affected,

however, by the country of origin of the study (O'Hara and Swain 1996). Gaynes et al. (2005), however, pointed out that the above meta-analysis was carried out prior to the definition of postpartum depression being re-defined as major and minor depression by the DSM-IV (American Psychiatric Association 1994).

A more recent systematic review of 28 international studies conducted between January 1980 and March 2000 , mentioned earlier when discussing antenatal depression, (Gavin et al. 2005; Gaynes et al. 2005) differentiated between major and minor depression, the criteria for differentiation being based on a clinical interview and recognised assessment tools such as the EPDS and the Beck Depression Inventory (BDI). The analysis found that as many as 19.2% of women suffered from a major or minor depressive episode during the first three months postpartum with as many as 7.1% having a major depressive episode. The wide CI of 10.7 to 31.9, however, indicates a significant uncertainty in these results. The incidence of a new episode of major or minor depression occurring during pregnancy, identified in the same meta- analysis, was 14.5% and was the same (14.5%) for a new episode occurring during the first three months postpartum (Gaynes et al. 2005). The incidence for a new episode of major depression was 6.5% in the first three postnatal months. As with discussion of the prevalence and incidence of antenatal depression, the variation in sensitivity and specificity and the multiple thresholds used in the measurement tools must be borne in mind when considering these figures.

A much larger systematic review of 143 studies from 40 culturally diverse countries found a wide variation in prevalence and incidence of postpartum depression depending on the threshold of the measurement instrument used, the type of reporting (self-report or interview) and cultural differences in symptom definition and expression (Halbreich and Karkun 2006). The authors found that the prevalence of postpartum depression as estimated by the EPDS, with culturally adjusted cut-offs varying from 9 to 13, varied among countries from almost 0% to almost 60%. Consistent with the findings of O'Hara and Swain (1996) a wider postpartum time window yielded a higher prevalence of

depression, but even when the time was standardised to six weeks postpartum there was still a substantial diversity in prevalence rates (Halbreich and Karkun 2006). The review concluded that future studies exploring the incidence of postpartum depression need to examine multiple dimensions impacting on mental health, such as anxiety, cross-cultural perceptions of normality and the use of culturally sensitive measurement means.

International studies comparing the prevalence of depression among postnatal women with depression in a general population group of women of a similar age, parity and marital status have found little evidence of a greater prevalence of depression in the postnatal groups (O'Hara et al. 1990; Cox et al. 1993; Augusto et al. 1996). A study of 2,730 postpartum and non-postpartum women in Norway found that the prevalence of depression, as assessed by a score of 10 or more on the EPDS, was significantly lower in postnatal women (8.9%) than among a control group of non-postnatal women (13.6%) (Eberhard-Gran et al. 2002). However, when controlling for identified risk factors of depression (history of stillbirth, operative delivery, and poor partner relationship) the odds ratio for depression was increased in the postnatal period. After adjusting for the other risk factors for depression the odds ratio of depression in the postpartum period was 1.6 (95% CI 1.0 to 2.6) (Eberhard-Gran et al. 2002).

Knowledge of the prevalence and incidence of postnatal depression is vital when planning evidence based health interventions and management (Chisholm et al. 2004). Yet, according to a very recent overview of five systematic reviews by Mann et al. (2010), which included three of the aforementioned meta-analyses (O'Hara and Swain 1996; Gavin et al. 2005; Halbreich and Karkun 2006), there is limited generalisable evidence to inform current knowledge. When the meta-analyses were appraised, only one (Gavin et al. 2005) met the criteria for a systematic review. The other four revealed limited methodological quality leading the authors of the review to conclude that current knowledge of the prevalence and incidence of postnatal depression in the first year following birth

is poor and inadequate in providing evidence upon which to base future planning (Mann et al. 2010).

1.4 Risk factors for perinatal depression

In recognition of the impact that emotional ill- health may have on women and their families, the identification and management of postnatal depression and other perinatal psychological and emotional disorders is high on current political and professional agendas in the UK (Department of Health 2004; CEMACH 2007; Mitchell and Coyne 2007; NICE 2007; Royal College of Obstetricians and Gynaecologists 2008). Identification of risk factors is paramount in developing a management strategy and yet the risks and causes of postnatal depression remain unclear (Cooper and Murray 1997). Forming a continuum they can, however, be grouped into four categories: antenatal risks, birth associated risk factors, immediate post-birth risk factors and postnatal risk factors (Willinck and Cotton 2004). Added to this could be preconception risks.

Three meta-analyses of over 100 international studies, including approximately 24,000 women, have identified the strongest predictors of postnatal depression (O'Hara and Swain 1996; Beck 2001; Robertson et al. 2004). The results were summarised in terms of the effect size (Cohen's d, which measures the relationship between two variables). This defined the effect of the risk factor on postnatal depression as strong, medium and small. Factors having a strong to medium effect were depressed mood or anxiety during pregnancy, previous history of depression or other psychiatric disorder, perceived low levels of social support and life stresses such as divorce, death of a loved one or moving house. Factors having a moderate effect on the development of postnatal depression were low self-esteem and poor marital relationship. Socioeconomic status and obstetric factors had a small effect (O'Hara and Swain 1996; Beck 2001; Robertson et al. 2004).

A large Australian prospective study exploring antenatal risk factors for postnatal depression, as assessed by a score of 12 or more on the EPDS, mentioned briefly earlier, found that most of the core factors identified in the three meta-analyses (O'Hara and Swain 1996; Beck 2001; Robertson et al. 2004) had significant effects on the Australian cohort (Milgrom et al. 2008). However, the authors identified antenatal depression together with low levels of support from a partner as the strongest independent antenatal predictors of postnatal depression (Milgrom et al. 2008).

As well as the major predictors for postnatal depression identified by the systematic reviews, extensive research worldwide has identified many other risk factors that suggest a large number of contributory variables of sociological, psychological and biological origin (Brugha et al. 1998; Nielsen Forman et al. 2000; Verkerk et al. 2003).

A large Danish prospective survey of 6,790 women followed from 16 weeks gestation and assessed for depression at eight weeks postpartum using a cut-off of 13 on the EPDS (Nielsen Forman et al. 2000), identified psychological distress as being the strongest antenatal predictor for the development of postpartum depression, with perceived social isolation being the strongest risk factor overall. This study reinforces the findings of earlier research conducted in the UK (Brugha et al. 1998) which demonstrated the link between the lack of social support and postnatal depression.

Although not focused specifically on postnatal depression, a recent study of a cohort of 783 women from the United Sates further reinforces the link between social support and depression (Spoozak et al. 2009). In the longitudinal study, aimed at evaluating the reliability and validity of a diagnostic social support interview for use in identifying risk of depression in pregnancy, the authors found a significant correlation between perceived high levels of support and decreased odds of depression in the first trimester. Frequency of contact with pregnant women's mother or father was found to be particularly significant, although

contact with groups, clubs or church was not considered significant to overall support (Spoozak et al. 2009).

A number of international studies have suggested that intrapartum events and experiences, such as operative delivery, impact on the subsequent development of postpartum depression (Astbury et al. 1994; Willinck and Cotton 2004). Nielsen Forman et al. (2000) in their study of the predictive powers of demographic, obstetric and psychosocial risk factors among 528 Danish women found no evidence, however, of an association between delivery complications, including both elective and emergency caesarean section, and postpartum depression. A prospective study of 239 South Korean women which sought to identify sociodemographic, obstetric and psychological risk factors for postpartum depression also failed to find significant obstetric risk factors that might be associated with postpartum depression (Kim et al. 2008).

Nevertheless, a prospective study of 1618 women in the Netherlands (Verkerk et al. 2003) which investigated whether the occurrence of depression in the first year after birth could be predicted during pregnancy, found that stress associated with events in pregnancy and during birth could enhance the development of postnatal depression, but only in those women already highly vulnerable to depression because of other causes. Only two major risk factors were identified in this study as being significant in the development of postpartum depression and these were severe depressive symptoms during pregnancy and a personal history of depression (Verkerk et al. 2003).

Additional factors to those found in the previously mentioned meta-analyses (O'Hara and Swain 1996; Beck 2001; Robertson et al. 2004) were identified in a longitudinal study of 594 women in Canada, designed to develop a multi-factorial predictive model of depression at one week postpartum (Dennis et al. 2004). The study, which used a cut-off point of greater than (>) 9 on the EPDS measured at one week postpartum, found that recent immigration status was a significant predictor, with immigrant women having almost five times the risk of exhibiting

depressive symptoms (Dennis et al. 2004). Further statistically significant factors identified were pregnancy induced hypertension (PIH), dissatisfaction with infant feeding method and unreadiness for discharge home from hospital.

The majority of research into risk factors for postnatal depression has concentrated on western society and consequently identified factors prevalent in developed and industrialised societies. Some studies, however, are beginning to emerge from less developed countries such as South Africa. In a large prospective cohort study of 1,035 South African women (Ramchandani et al. 2009), 16.4% were identified as having probable depression (as identified by the Pitt Depression Questionnaire [Pitt 1968]), the strongest independent predictors being partnership difficulties (adjusted odds ratio [OR] 1.6, CI 1.0 – 2.4) and extreme social stressors, such as witnessing a violent crime or the danger of being killed (OR 2.5, CI 1.5 – 4.0). Although women in the UK are not exposed to the turbulent lifestyles experienced by women in a socially and politically unstable nation such as South Africa, there are pockets of underprivileged society within Britain where exposure to violence may predict similar depressive symptoms (Regan 2011).

A number of international studies have illustrated the predictive quality of antenatal anxiety disorders in identifying postnatal depression (Heron et al. 2004; Grant et al. 2008; Skouteris et al. 2009). A prospective longitudinal study of over 8,300 childbearing women in the UK, exploring the course of anxiety and depression though pregnancy and postpartum, found that not only were anxiety symptoms higher in the antenatal period than in the postnatal period but also antenatal anxiety predicted postnatal depression at eight weeks postpartum, even after controlling for antenatal depression (Heron et al. 2004). Consistent with these findings a prospective study of 100 Australian women which investigated maternal anxiety through the course of pregnancy and into motherhood also found antenatal anxiety to be a predictor of postnatal anxiety (Grant et al. 2008). However, unlike the study by Heron et al. (2004) which relied on self-report measures, which the authors believed may have limited the

response rate to their questions, Grant et al. (2008) used a diagnostic measure (the DSM –IV) which showed that maternal anxiety was a persistent clinical condition which endured throughout pregnancy and postpartum.

More detailed analysis of the predictive value of anxiety disorders was found in an Italian study of specific anxiety disorders, namely panic disorder, agoraphobia, social phobia, specific phobia, generalised anxiety disorder (GAD), obsessive compulsive disorder (OCD) and posttraumatic stress disorder (PTSD) during pregnancy in a group of 500 women (Mauri et al. 2010). While agreeing that first trimester antenatal anxiety predicted postnatal depression (as assessed by a score of 13 or more on the EPDS), the finding of this study were more precise. They showed that, after adjusting for other potential confounders such as single status, partnership problems, low self-esteem, low socioeconomic status (SES), lack of social support, prior or current depression, only panic disorder and social phobias predicted minor and major depression in the first month postpartum.

Not only does antenatal anxiety predict postnatal depression but studies also show that it may be a greater predictor than antenatal depression. A study of 408 primiparous Australian women (Matthey et al. 2003) found that a history of anxiety disorders, characterised as generalized anxiety disorder and panic, was a greater risk factor for a woman developing postnatal depression than a history of a depressive disorder, leading the authors to conclude that professionals should use the term postnatal mood disorder rather than postnatal depressive disorder. Miller et al. (2006), in the previously mentioned Australian study of anxiety and stress in the postpartum period, reached a similar conclusion, proposing a broader classification of 'postnatal distress' rather than depression, which would include anxiety and stress that are not necessarily embraced within a diagnosis of depression. This would identify women who may be overlooked when professionals use markers for depression to identify women at risk. In their study 10% of the sample would have 'fallen through the net' using traditional identification markers (Miller et al. 2006).

1.5 Predictive tools and screening for postnatal depression

A number of researchers have attempted to draw risk factors together into a predictive tool that can usefully determine which women are more likely to develop postnatal depression and thus might be used as a screening measure in clinical practice (Webster et al. 2003; Dennis et al. 2004; Spoozak et al. 2009 2003). Screening is seen as a process of risk reduction, whereby people within a specific population are offered a test that will detect those who are more likely to be helped than harmed by being identified as vulnerable and as a result offered further treatment to reduce the risk of the disease happening (National Screening Committee [NSC] 2000). The adverse consequences of perinatal depression for the mother and family suggest that early and effective screening and appropriate management are essential.

A number of attempts have been made internationally to develop antenatal predictive tools (Appleby et al. 1994; Stamp et al. 1996; Cooper et al. 1996; Nielsen Forman et al. 2000; Honey et al. 2003; Webster et al. 2003; Spoozak et al. 2009), but their success has been limited. A systematic review of 16 international studies examined the screening properties of antenatal measurement tools used to determine women 'at risk' and 'not at risk' of developing postnatal depression (Austin and Lumley 2003). The review, which examined the sensitivity, specificity, positive and negative predictive values and positive and negative likelihood ratios of the measurement tools, found that results were inconsistent, with the timing of screening varying from early to late pregnancy and a variety of depression screening tools used at a wide range of time points postnatally (from five weeks to one year postpartum) (Austin and Lumley 2003). The EPDS was the chosen evaluation tool for two-thirds of the studies, with others using a clinical interview or a combination of both. However, where the EPDS was used there was a substantial difference in the cut-off point selected to detect likely depression (ranging from greater than [>] 9 to greater than [>] 14). This affected not only the prevalence of depression detected but

also the sensitivity and specificity of the tools. The EPDS was used in the two largest studies included in the review (Cooper et al. 1996; Nielsen Forman et al. 2000). Cooper and colleagues used a cut-off point of > 8 at 5 weeks and > 12 at 16 weeks, while Nielsen Forman and colleagues used a cut-off of >12 at 4 months. The sensitivity and specificity of the tools were found to be 0.35 and 0.87, and 0.79 and 0.50 respectively, indicating that the tools were weak in positively identifying those women suffering from depression and also in correctly identifying those who were not suffering from depression (Austin and Lumley 2003).

A major problem identified by the reviewers was that the sample sizes were too small to detect postnatal depression as, given a depression prevalence of 13% with a 95% CI of plus or minus 5%, a sample of at least 1300 participants would be needed; and allowing for misclassification, between 1600 and 2100 participants would be needed for a sensitivity of 80% or 40% (Austin and Lumley 2003). In the studies reviewed only six had a sample size close to 1300 women. A further problem identified was the omission of possible key risk factors such as past history of depression, a history of abuse or neglect in childhood or personality disorder. The exclusion of these factors may have limited the sensitivity of the instruments and would also reduce their applicability to diverse populations (Austin and Lumley 2003). Based on their findings the authors concluded that no antenatal screening instrument then met criteria for routine use in the antenatal period. In a further reflection of the review Austin (2004) commented that predicting postpartum depression 6 to 12 months in advance, when so many other variables are likely to intervene, is an unrealistic goal.

In recognition of the fact that antenatal factors alone might be insufficient in predicting postnatal depression, a predictive tool combining antenatal, intrapartum and postnatal risk factors was developed (Webster et al. 2003). The tool, the Brisbane Predictive Index, was built on the premise that women suffering from a combination of perinatal risk factors were more likely to develop postnatal depression than those with only antenatal risks. The index was found

to correctly predict 40% of women with postnatal depression with a specificity of 36% and a positive predictive value of 92%. In a later prospective testing of the Brisbane Predictive Index the developers of the tool declared that although the tool may be useful for research purposes in identifying women with risk factors, the limited sensitivity, which increased slightly, and the positive predictive value, which did not change from the original retrospective testing made it unsuitable as a predictive tool in clinical practice (Webster et al. 2006).

Dennis et al. (2004) developed a predictive tool, embracing many risk factors, designed to be used at one week postpartum. However, the reliability of assessing postnatal depression so soon after birth could be questioned. The DSM –IV (American Psychiatric Association 1994, 2000) considers postpartum depression to be diagnosed within 4 weeks after birth, as women may experience transitory blues for up to two weeks postnatally (Fossey et al. 1997). Dennis and colleagues acknowledged that maternity blues could confound an assessment of depression at this time, but rationalised and supported the decision with studies that demonstrated that early maternal mood was consistently associated with postpartum depression (Cox et al. 1987; Beck et al. 1992). Moreover a French study of 299 women which compared scores on the EPDS at two to three days post birth with subsequent scores at 4-6 weeks postpartum found high correlations between the scores ($r = 0.61$), suggesting that early EPDS scores are predictive of subsequent symptomatology (Chabrol and Teissedre 2004). It would be questionable however whether factors such as hospital inpatient experiences and feeding difficulties occurring in the first week could be considered as risk factors when they could resolve once women settled into a routine at home. A review of screening instruments for postpartum depression concluded that a reasonable time for first screening for depression would be two weeks after the birth when life becomes more settled (Boyd et al. 2005).

In the UK, a review of the evidence on available antenatal prediction tools commissioned by the UK National Screening Committee (NSC) found that although the risks for postnatal depression are known, they are unhelpful in

reliably predicting the development of the condition (Shakespeare 2005). The NSC recommend that in the absence of reliable evidence as to its value, screening for postnatal depression should only be carried out antenatally in the UK within a research context, with a research protocol having been fully approved by an ethics committee (NSC 2000). A recent NSC review of more contemporary research similarly concluded that there was insufficient evidence to conclude that any screening strategy for postnatal depression would be effective in improving maternal outcomes (Hill 2010).

At present the prediction of depression through the use of a specific tool is considered unrealistic in the UK. Guidelines developed by NICE to inform antenatal and postnatal maternal mental health in England and Wales recommend that in seeking to detect any perinatal psychological disorder the only specific predictor to be used at this current time should be previous psychiatric history (NICE 2007). This variable has been shown in numerous studies internationally to be a strong risk factor for postnatal depression (Cooper et al. 1996; Stamp et al. 1996; Webster et al. 2003).

Due to the far reaching effects of maternal depression on all the family, researchers continue to seek a reliable tool to identify vulnerable women. In the meantime, the importance of screening women to detect a history or presence of mental illness is highlighted in a number of UK reports (SIGN 2002; DOH 2004; CEMACH 2007; NICE 2007; CMACE 2011). Early antenatal detection of possible depression remains important because of the associated morbidity for mother and child (Austin 2004). Moreover management of symptoms begun during pregnancy might reduce subsequent postnatal mood disorders (Buist et al. 1998).

NICE (2007) recommends that practitioners ask women two specific questions, developed from a study of 536 male and female patients attending an urgent care clinic in San Francisco to be effective in identifying people with major depression (Whooley et al. 1997). These questions, which NICE guidance recommends should be asked at each initial contact with the woman, at booking and

postnatally, are, 'during the past month have you often been bothered by feeling down, depressed or hopeless?' and 'during the past month have you been bothered by little interest or pleasure in doing things?' (NICE 2007). If a woman gives a positive response to both questions she should be asked a third question to determine whether she feels she wants or needs help with this.

The 'Whooley questions' were designed for use with a general population of males and females. Their effectiveness in identifying postnatal depression in a childbearing population remains to be proven (Hill 2010). Moreover, although NICE recommend that the use of short questions is beneficial in initially identifying a potential problem the value of such a brief assessment might be questionable. A meta-analysis of 22 studies carried out in the UK to evaluate the use of very short screening instruments to identify depression in a primary care setting found that one-question tools were ineffective but two-question tools performed adequately, correctly identifying eight out of 10 cases of depression; however the analysis also found a high false-positive rate, with six out of 10 cases being incorrectly identified as depressed (Mitchell and Coyne 2007). The use of short screening tools has not yet been evaluated in perinatal settings.

An antenatal needs assessment tool, developed for use by health visitors in the UK to encourage consistency in approach, sought to identify women at risk of developing depression through identification of childhood experiences, perceptions of physical and emotional support, confidence in future motherhood (with information obtained through discussion supported by formal questions) and screening for depression through assessment of previous depressive incidents and use of the EPDS (Ingram and Taylor 2007). An antenatal score of >13 in the EPDS gave a positive predictive value of 35% for a subsequent high postnatal score, while a score of >15 gave a 67% positive predictive value. When a compilation of 'at risk' responses to antenatal emotional support, childhood experiences and antenatal EPDS were compared with the postnatal EPDS scores there was a positive predictive value of 86%. The tool, which was used with 118 women with complete antenatal and postnatal data, demonstrated higher

sensitivity, specificity and positive predictive value than the tools reviewed in previous meta-analysis (Austin and Lumley 2003). However, the small sample size is a limitation to the study and the argument pertaining to the accurate identification of postnatal depression, given that approximately 13% of women will develop it, described fully in relation to the aforementioned meta-analysis, is applicable here.

Rather than using specific measurement tools, which at the present time is not a feasible option, studies in Australia and Canada reported the use of antenatal screening protocols utilising psychosocial factors to detect women with an identifiable risk of developing psychological ill-health (Reid et al. 1998; Austin 2004; Matthey et al. 2004). The protocols took the form of either an interview or a brief questionnaire, and both approaches incorporated the established risk factors for depression, identified in the meta-analyses referred to earlier (O'Hara and Swain 1996, Beck 2001) together with quality of own parenting and past or current history of abuse of neglect (Reid et al. 1998; Austin 2004; Matthey et al. 2004).

Previous explorations of risk factors together with attempts at developing predictive tools have examined physical, sociological and environmental factors relating to the development of postnatal depression (Cooper et al. 1996; Honey et al. 2003). Other attempts have explored psychological factors as predictors of depression, such as coping styles, and avoidance and distancing as related to negative emotional outcomes (Faisal-Cury et al. 2004; Righetti-Veltema et al. 1998). Personality traits have been explored, revealing that a combination of high neuroticism and high introversion considerably increased the risk of developing postpartum depression (Verkerk et al. 2005).

Hormonal changes during the perinatal period, affecting the production of progesterone, oestrogen, prolactin, oxytocin, cortisol and thyroxin have been postulated as predictors of psychological disorders (Pop et al, 1991; Gregoire et al. 1996). A study of 182 women in the USA who had their serum prolactin,

progesterone, oestradiol and cortisol measured as part of an to assessment of psychological, hormonal and environmental predictors of depression postnatally found little evidence of hormonal influences on postnatal depression (O'Hara et al. 1991). This finding was confirmed by Hendrick et al. (1998) in a review of the literature relating to hormonal effects on postpartum depression. The authors found that while many studies internationally speculated on the effects of a range of hormones such as oestradiol, progesterone, thyroid hormones, pituitary hormones and cortisol on the development of postpartum depression, methodological problems such as inconsistencies in the timing of blood assays, failure to recognise the effects of breastfeeding on hormonal levels and lack of recognition of seasonal and diurnal variations in hormonal levels resulted in conflicting findings (Hendrick et al. 1998).

Summary

The chapter has considered perinatal mental health disorders, specifically anxiety and depression, and explored the incidence and prevalence of antenatal and postnatal depression. Risk factors and predictive tools to identify perinatal depression have been discussed and the suitability of screening considered.

The literature review has identified that a large number of variables have been explored in an attempt to aid the early identification of women at risk of developing postnatal depression. Despite being such a complex emotional period in a woman's life, no studies appear to have considered the role that the processing of those emotions might play in the maintenance of emotional wellbeing. To achieve this, it will be essential to have an understanding of the concept of emotional processing and a tool with which to measure it. Such a measurement tool, the Emotional Processing Scale (EPS), explored in Chapter 6, has been developed and validated for international use (Baker et al. 2007b).

2. IMPACT OF POOR PERINATAL MENTAL HEALTH ON THE WOMAN AND FAMILY

Introduction to chapter

Psychological wellbeing in pregnant and postnatal women is an important public health concern. As well as negatively influencing the lives of women themselves, poor perinatal mental health can impact on all aspects of family life, not only affecting partner relationships and the stability of the family unit but also the shorter and longer term cognitive, behavioural and motor development of infants and young children (Huizink et al. 2003).

This chapter explores the impact that maternal emotional and psychological health may have on the woman and her family, and on fetal and infant development, highlighting the importance of understanding women's emotions to protect future health. The chapter begins by considering the impact of poor mental health on the woman herself, family relationships and parenting skills. It continues by exploring how it may affect the stability of the pregnancy and consequently the wellbeing of the fetus and considers how the effects on fetal development continue after birth, impacting on the health and development of the newborn baby, with longer term effects on infant, child and adolescent behaviour and development. The chapter concludes with a summary of why an understanding of women's emotions and psychological health is vital in order to help prevent or ameliorate the potential harm impacting on the immediate family and future generations.

2.1 Impact of poor maternal psychological health on families

Depression and other maternal mental health disorders can impact not only on the woman herself but also on other family members (NICE 2007). Being a disorder affecting communication, maternal depression, can have far reaching

effects on interactions with partners and children, impacting on their health and wellbeing (Sidor et al. 2011).

Partners

The association between the quality of partner relationships and maternal depression is well documented, although which causes the other remains problematic (Assh and Byers 1996; Mamun et al. 2009). One study showed that for 150 newly married women from small towns in America the causal pathway was from dissatisfaction with the relationship to depression, while for their partners it was the opposite way round (Fincham et al. 1997). A longitudinal study of just under 3,700 Australian women with postnatal depressive symptomatology, followed over a 14 year period, however, found that the relationship of depression and poor partner relationship was bi-directional (Mamun et al. 2009). Whichever way the direction, however, it is clear that women suffering from perinatal depression may also experience poor relationships and consequential lack of support from their partners.

Depression and poor mental health in general experienced by women can also impact on the mental health of their partner and increase their risk of developing a mental health disorder. In one small study of the partners of 24 women admitted to a mother and baby unit because of severe psychiatric disorders, over half were found to develop mental health problems (as diagnosed by the DSM III) following their partner's admission (Lovestone and Kumar 1993). Matthey et al. (2000), investigating the occurrence of postnatal depression in a group of 157 first time Australian mothers and fathers found minimal associations between the depressive symptoms of couples in the antenatal period , but increasing associations in the first year postpartum, suggesting that although the causes of depression are different in mothers and fathers there is greater commonality in the first year postpartum . A larger meta-analysis of 20 international studies which explored paternal depressive symptoms in the first year after birth confirmed these findings (Goodman 2004). The study found that among men whose partners were experiencing postpartum depression the incidence of

paternal depression was 24% to 50%, and men were significantly more likely to suffer from depression if their partner experienced depression either antenatally or postpartum (Goodman 2004). The authors also suggested that the measures used to assess depression in men (self-report measures such as the EPDS or BDI and clinical interviews), being the same measures used to asses maternal depression, might not pick up unique dimensions of paternal gender-sensitive distress or depression, resulting in under reporting of symptoms.

The implications of paternal depression for the health and wellbeing of children can be as great as those of maternal depression. A study of 8,431 UK fathers, undertaken as part of a larger population-based study of childhood, found that after controlling for maternal postnatal depression, depression in fathers in the postnatal period was associated with adverse emotional and behavioural outcomes in three to five year old children (Ramchandani et al. 2005). The impact of maternal mental health disorders may also, as a consequence, impact on the socioeconomic situation of the couple if poor psychological health prevents the partner from continuing with employment (NICE 2007). This can have far reaching implications for the stability and wellbeing of the family unit.

Mother-infant interaction

Communication between mother and baby in the postpartum period is largely non-verbal involving the mother responding to infant facial expressions (Pearson et al. 2010; Stein et al. 2010). There is growing evidence that mothers who are depressed have difficulty recognising and responding to these non-verbal signals from their babies (Murray et al. 2010) and this failure to recognise clues from their infant's facial expressions and behaviour can lead to problematic interaction between mother and baby which may adversely affect infant development (Field et al. 1993; Arteche et al. 2011).

Studies have identified links between women who experience anxiety and depression in pregnancy and postpartum and subsequent interaction with their offspring. A meta-analysis of 33 international studies which included data on

4,561 women and infant dyads found that maternal depression, as assessed by a combination of self-report measures and/or clinical interview, had adverse effects on maternal-infant interaction in the first year after birth, with depressed mothers displaying inadequate stimulation and arousal techniques (Beck 1999).

A study of 45 women in the UK, which investigated the effects of postnatal depression on their ability to interpret infant facial expressions from a series of photographs presented to them found that women who were depressed were more likely to rate negative expressions less positively, suggesting that this negative bias might indicate underlying problems that they had in appraising their own infants' signals (Stein et al. 2010).

This conclusion was confirmed by another UK study which assessed how well a group of 89 depressed and non-depressed women were able to recognise gradually morphed infant facial expressions in photographs (Arteche et al. 2011). The authors found that depressed mothers were less likely to recognise happy infant faces than non-depressed mothers.

Maternal-fetal attachment

Although mother-infant interaction is a subject extensively explored, the attachment of a mother to her unborn child in utero is a developing area of research (Salisbury et al. 2003; McFarland et al. 2011). Maternal-fetal attachment has been described as part of women's emotional adjustment to pregnancy when a relationship between a mother and her unborn baby develops, based on cognitive representation of the fetus and behaviours that represent nurturing and commitment to the fetus (Salisbury et al. 2003). It is considered to be part of a woman's preparation for her new maternal role (Mercer 2004). Maternal-fetal attachment is believed to increase and intensify as pregnancy progresses and lays the foundations for the mother-infant relationship and interaction which develops after birth. Anything which impacts on the maternal-fetal attachment therefore could have long-term outcomes for the developing

infant and child, resulting in impaired emotional and cognitive development of the child (Ranson and Urichuk 2008).

Studies have shown that maternal low mood is related to poorer maternal-fetal attachment (Lindgren 2003). A study of 161 American women undertaken to examine the relationship between major depression in the antenatal period and maternal-fetal attachment found that depression, as measured by the DSM-IV and the Hamilton Rating Scale for Depression was related to significantly lower scores on the Maternal-Fetal Attachment Scale across the second and third trimesters, indicating poorer recognition of the nurturing needs of the fetus (McFarland et al. 2011). The authors concluded that as mothers' attachment and connection with their unborn child appear to be reflected in their experiences and enjoyment of pregnancy it was not surprising that women experiencing symptoms of hopelessness, worthlessness and reduced functioning associated with depression might lack the motivation and confidence to nurture the fetus (McFarland et al. 2011). Although in the early stages of exploration it seems likely therefore that women suffering from antenatal depression may experience difficulties in developing an attachment to their unborn child, with potentially greater ramifications in the postpartum period.

Breastfeeding

It is recognised that breastfeeding is an essential start to life for all babies (World Health Organisarion 2003a,b; Bolling et al. 2007). Breastfeeding outcomes, however, also appear to be negatively affected by poor maternal emotional and psychological health, especially postpartum (Misri et al. 1997; Colin and Scott 2002).

A cohort study of 1,745 women in Australia, which looked at the impact of postnatal depression on breastfeeding duration, found that postnatal depression had a significant negative impact on breastfeeding duration (Henderson et al. 2003). The authors found that women who were depressed at any time in the first year postpartum had a 1.25 times greater risk of ceasing breastfeeding than

women who did not experience depression. In a longitudinal study of 594 mothers in Canada, which explored the effects of postpartum depression on infant feeding outcomes, symptoms of depression in the immediate postpartum period were found to have a negative influence on breastfeeding outcomes (Dennis and McQueen 2007). The study showed that breastfeeding mothers who displayed signs of depression one week after birth, as assessed by scores of 12 or more on the EPDS, were significantly more likely to discontinue breastfeeding at eight weeks than women with lower scores, illustrating the negative impact of maternal depression on the wellbeing of the mothers.

A qualitative systematic review of 49 papers from 15 countries, published between 1981 and 2007, examined the relationship between postnatal depressive symptomatology (as defined by self-reports of depressive symptoms in the first year following birth or clinical interview) and infant feeding outcomes (as defined by participant self-reports). The review found that women with depressive symptoms in the postnatal period were at greater risk of suboptimal feeding outcomes, including increased breastfeeding difficulties, decreased breastfeeding duration and decreased levels of breastfeeding self-efficacy as well as some early evidence that depressed women were less likely to initiate breastfeeding (Dennis and McQueen 2009).

Studies have considered the causal direction of the relationship between maternal depression and breastfeeding to determine whether it is unidirectional (one causing the other) or bidirectional (maternal depression interfering with breastfeeding success and poor breastfeeding contributing to maternal depression (Dennis and McQueen 2009). A study of 592 Italian women tested the ability of the EPDS completed at two to three days following delivery to detect later breastfeeding difficulties in order to determine more clearly the causative direction of the relationship between depression and poor infant feeding outcomes (Gagliardi et al. 2010). Results showed that mothers with higher EPDS scores were more likely to artificially feed at three months postpartum, the odds of artificial feeding increasing with the EPDS score (OR

1.06, 95% CI 1.01 to 1.11). An increase of one point in the EPDS increased the odds of artificially feeding at 12 to 14 weeks by 6%.

2.2 Poor maternal psychological health and associated poor health behaviours

Maternal depression affects women of all socioeconomic classes, but appears to impact more strongly on low income families where depression is a inextricably linked to life circumstances, environment, poverty, lack of social support networks, substance abuse and partner and child abuse (Knitzer et al. 2008). Figures for the UK have shown significant numbers of women bringing children up alone, without support, in poverty or in suboptimal accommodation (NICE 2007). Mental health disorders can accentuate the effects and impact of these conditions on the vulnerability and wellbeing of the family (NICE 2007).

Low socioeconomic status

Pregnant women from low income backgrounds and those who are homeless suffer greater levels of stress and anxiety, exacerbated for some by living in unsafe neighbourhoods (Siefert et al. 2000; Stein et al. 2000). In a small study of the prevalence and incidence of depression among 192 pregnant and postpartum women of low socioeconomic status in the USA ,the rates of depression among those from low income families was double that reported for middle-class samples in pregnancy and postpartum (Hobfoll et al. 1995). A community-based prospective study of 876 women in the USA which explored associations between low socioeconomic status and poor fetal outcomes found that women with elevated levels of depression as assessed on the Center for Epidemiological Studies Depression Scale (CES-D) were more likely to come from a low social class as categorised by household occupational status, income and educational qualifications, and almost half gave birth to babies with low weight (Hoffman and Hatch 2000). The authors postulated that the restriction in fetal growth may have been due to the smoking habits associated with depressed mothers from

low income groups or to fluctuating levels of cortisol passing from the depressed mother to the fetus. The latter is discussed in greater detail later in this chapter.

Maternal depression may be co-morbid with poor health practices such as inadequate nutrition, smoking, alcohol or substance misuse, domestic abuse and avoidance of professional care during pregnancy, all of which place the unborn and newborn child at serious risk as well as the mother (Jasinski 2004; Neggers et al. 2006).

Smoking

The risks of intra-uterine growth restriction, low birth weight and preterm delivery to women who smoke in pregnancy are well documented (Castles et al. 1999; Shah and Bracken 2000; Quinton et al. 2008). Infants and children exposed to cigarette smoke are at greater risk of suffering health problems such as middle ear infections, asthma and other respiratory diseases or sudden infant death (Fleming and Blair 2007; Peter and Peter 2007; Carlsen and Carlsen 2008; Liebrechts-Akkerman et al. 2011). A study of 819 pregnant smokers in the USA found that women who gave up smoking during pregnancy had lower levels of stress (Ludman et al. 2000). However, the study also showed that a lack of depressive symptoms was not predictive of smoking cessation later in pregnancy. In women who give up smoking in pregnancy for health reasons depression can cause a relapse or an increase in cigarette consumption (Hall et al. 1993). A Norwegian survey which examined the relationship between depression and smoking during pregnancy in a group of 487 women found that depression was a significant predictor of smoking in pregnancy even after controlling for factors such as the presence of other smokers in the house and a negative attitude towards the pregnancy (Zhu and Valbø 2002).

Domestic abuse

Depression in pregnancy is strongly related to domestic abuse. UK figures show that one in four women across all socioeconomic groups experience physical or psychological domestic abuse at some time in their lives, and at critical points

such as pregnancy and postpartum it is likely to increase (British Medical Association 1998; Shadigian and Bauer 2004; Charles and Perreira 2007; Tiwari et al. 2008). Domestic abuse can escalate in pregnancy leading to serious consequences for mother and fetus, including suicide ideation (CMACE 2011). In many cases the abuse can be hidden such that depression experienced by women may not be associated with abuse by the health professional (Jewkes et al. 2002). A prospective study of 1,897 American women screened for abuse during pregnancy using validated screening interviews found that nearly one third of adolescents and one quarter of adult women had been abused by their partner during their pregnancy or in the year leading up to it and the abuse was related to poor obstetric outcomes and low birth weight (Curry et al. 1998). A study of 3,245 pregnant women in Hong Kong (Tiwari et al. 2008) found that despite physical violence being the focus of much of research, psychological or emotional violence was more common and was shown to have as detrimental an impact on mental health , as measured by a cut-off of 13 or more on the EPDS, as physical abuse. An Australian study of 110 pregnant women found that those who had been subject to domestic abuse in pregnancy scored lower on the Maternal Attachment Scale (Condon and Corkingdale 1998) than those not exposed to domestic abuse (Quinlivan and Evans 2005). Poor maternal-infant attachment has been shown to have enduring long-term adverse outcomes for children (Sinclair and Murray 1998).

The impact of domestic abuse has clear implications for the safety of the unborn child and neonate, confounding the problem with further issues for the mother relating to safeguarding children, which can in turn result in greater levels of depression (Lazenbatt and Greer 2009). In over half of the cases of domestic abuse in the UK children in the relationship are abused (CEMACH 2007). Domestic abuse in pregnancy has been shown to be related to physical and emotional child abuse and neglect, with children being at highest risk during the first year of their lives (Butchart and Villaveces 2003).

2.3 Impact of poor maternal psychological health for those with severe psychiatric disorders

Women with recognised psychiatric disorders are at greatest risk during pregnancy and postpartum if their needs are not recognised and addressed. Women suffering from bipolar disorder have an elevated risk of relapse in the first few months after the birth of their child (Kendal et al. 1987), and for these women there is an increased rate of suicide (CEMACH 2007; CMACE 2011). Women who have had an episode of serious mental illness in the past are also at an increased risk of developing a postpartum onset mental illness, even if they have been well during pregnancy (CMACE 2011). Reports into maternal deaths in the UK have shown that over half of the women who died from suicide had a previous history of a mental illness (CEMACH 2007; CMACE 2011). An American study which sought to identify the prevalence and correlates of suicide ideation during pregnancy of 3,347 women from diverse backgrounds found that antenatal major depression as assessed by the Patient Health Questionnaire (PHQ) was the strongest risk factor of antenatal suicide ideation (Gavin et al. 2011).

Social isolation and exclusion are associated with mental illness, and personality and social functioning disorders may mean that the woman is unable to care for herself or her newborn baby (NICE 2007). The impact of this can be seen in the significant number of women with schizophrenia who lose custody of their children (Howard 2005). The worst scenario following loss of custody is maternal suicide (CMACE 2011). Of the 29 women who committed suicide in the UK in the last triennium reported (2006 -2008) five had been referred to social services because they suffered from a psychiatric condition rather than because of concerns about the welfare of the child but these women appear to have taken their own lives because of concerns that the child would be removed (CMACE 2011).

2.4 Impact of poor maternal mental health on the developing fetus

Poor maternal psychological and emotional health and anxiety have been found to affect the programming and development of the unborn fetus and the newborn child (Murray and Cooper 1996: Sinclair and Murray 1998; Glover and O'Connor 2006), with potentially far reaching effects on the long-term wellbeing of the infant and adolescent (O'Connor et al. 2002; Van den Bergh et al. 2005a; Van den Bergh et al. 2005b). Depression experienced antenatally has been identified as a significant predictive risk factor for infant wellbeing (Louma et al. 2001).

There has been an increasing interest in assessing the effects that women's emotional and psychological state might have on the uterine environment and subsequent fetal development (Glover 1997; Monk 2001). Maternal depression and anxiety appear to impact on the neurobiological and physical development of the fetus resulting in pregnancy and birth complications and subsequent longer term cognitive and behavioural developmental problems (Beck 1999; Diego et al. 2005; O'Connor et al. 2005). It would appear from a number of studies that poor maternal emotional and psychological health can have adverse effects at any stage in fetal programming and growth, the outcomes being dependent on the development taking place at that time (Van den Bergh et al. 2005b).

Intrauterine growth restriction and preterm birth

The health of a newborn is determined by maternal physical and psychological health, fetal wellbeing in-utero and subsequent pregnancy and birth events. Preterm birth, resulting from intrauterine growth restriction, and resulting in low birth weight, can adversely affect long-term outcomes for the child. Preterm birth and low birth weight can lead to increased neonatal, infant and childhood developmental impairment, morbidity and mortality (Wilson-Costello et al. 2005; Swamy et al. 2008).

Studies conducted in a number of countries have consistently found that stress hormones produced by the mother in pregnancy as a response to anxiety can adversely affect the growing fetus, leading to preterm labour and birth (hedegaard et al. 1993; Copper et al. 1996; Grote et al. 2010). A number of mechanisms have been suggested for this. One possible mechanism may be that maternal distress and anxiety activate the hypothalamic-pituitary-adrenal (HPA) axis (the emotion-regulatory system) leading to altered blood flow through the placenta. Teixeira et al. (1999), in a study of anxiety in a cohort of 100 women in the third trimester, found that alterations in uterine artery blood flow were especially significant at this time when the fetal brain, especially the temporal lobe, is increasing rapidly in size and developing connections between nerve cells. The findings of a study by Vythilingum et al. (2010) exploring the effects of maternal distress on uterine blood flow in each trimester, reinforced the belief that maternal anxiety has greater effects in later pregnancy, although the authors stressed the complexities involved in understanding the relationship between distress and changes in placental circulation.

High uterine artery resistance, which affects placental perfusion, is associated with pregnancy induced hypertension and pre-eclampsia (Ness and Sibai 2006), which can subsequently lead to intrauterine growth restriction and preterm birth. A study of 623 nulliparous Finnish women who were considered by guidelines to be at low risk of developing pre-eclampsia, found that those women who were depressed or anxious in pregnancy were at increased risk for subsequent hypertension and pre-eclampsia (Kurki et al. 2000). A more recent prospective study undertaken in Iran (Nasiri Amiri et al. 2010), which measured the state and trait anxiety of 682 women, found that raised anxiety levels between 20 and 28 weeks gestation were associated with preterm birth and low birth weight, an outcome of impaired placental perfusion.

The findings of a recent meta-analysis of 29 international studies which looked at maternal depression during pregnancy and the risks of adverse fetal/infant outcomes found that antenatal depression was associated with moderate, but

statistically significant risks of intrauterine growth restriction, preterm birth and low birth weight, although the magnitude of the effect varied depending on the depression measure (self-report scale or structured clinical interview), and socioeconomic status (Grote et al. 2010). The countries included in the analysis were classified into three groups – the USA, Europe and developing countries. Consistent with World Health Organization statistics that suggest that women from developing countries are at greater risk of intrauterine growth restriction and low birth weight babies because of limited access to adequate antenatal and mental health care (World Health Organization 2003), the authors of the meta-analysis agreed that country location was a significant moderator of outcomes associated with antenatal depression (Grote et al. 2010).

Whist the aforementioned studies suggest that the onset of poor maternal emotional and psychological health in the later stages of pregnancy may lead to preterm birth, other studies have found women may be more vulnerable to these conditions much earlier in pregnancy. A study of the effects of the timing of stress during pregnancy on emotional responses and birth outcomes found that, among 40 survivors of a Californian earthquake, women in the first trimester of pregnancy experiencing stress from the events of the earthquake appeared to be at a greater risk of preterm birth than those in the third trimester (Glynn et al. 2001). The authors concluded that as pregnancy advanced women became less sensitive to the effects of stress thus protecting the fetus from adverse influences. The study, however, has a small number of participants and thus the results may not be generalisable to a larger population.

In contrast, a study of 20 Spanish women, assessing fetal behaviour and response to maternal anxiety and stress hormones at 15 weeks gestation through ultrasound observation found no significant relationship between anxiety and fetal development in early pregnancy (Bartha et al. 2003). This study, like the previous one, had a very small number of participants, making generalisability to a larger population less certain.

A systematic review of 14 international prospective studies which used a combination of ultrasound, developmental measurement scales and observation to explore relationships between poor maternal psychological health and the effects on the fetus and developing child found inconsistencies with regard to the gestational age at which the effects of antenatal maternal anxiety and stress were most pronounced (Van den Bergh et al. 2005b). The authors suggested that the reason for the differing timings for vulnerability to maternal stress may be an indication that fetal response patterns vary at different gestations when different mechanisms are operating. However, the effect of varied measurement tactics and observational differences in the studies may also account for discrepancies in findings (Van den Bergh et al. 2005b). Differing opinions surrounding the effect that the timing of stress has on fetal outcomes may be explained by the fact that anxiety and stress adversely affect the fetus at any stage in pregnancy, the outcomes being similar, despite the biological mechanisms differing depending on the stage in pregnancy (Glover and O' Connor 2002; Van den Bergh et al. 2005b).

Fetal brain development

In addition to reducing intrauterine arterial blood flow leading to restricted fetal growth, poor maternal psychological health has also been found to affect the neurological development of the fetus (Teixeira et al. 1999; Monk 2001; O'Connor et al. 2002; Vythilingum et al. 2010). Concluding their findings from the aforementioned systematic review Van den Berg at al. (2005b) suggested that the fact that maternal stress is associated not only with compromised fetal development but also longer term infant and adolescent outcomes, even after adjusting for other relevant antenatal and postnatal confounders, may indicate that a programming effect on fetal brain development takes place. Fetal programming relates to the concept that exposure to different elements within the uterine environment at particular periods of brain development will 'programme' the brain and biological systems to react in certain ways in the future (Glover and O'Connor 2006). Ultrasound studies examining the

intrauterine behaviour of the fetus in response to maternal stress help to explain how maternal psychological variables may shape brain development and subsequent neurobehavioural development of the fetus (Dipietro et al. 2002; Bartha et al. 2003; Dipietro et al. 2003; Sandman et al. 2003).

The conclusions drawn by Van den Bergh (2005a) were also proposed earlier in a prospective, longitudinal study of over 7,000 women in the UK, which tested the hypothesis that maternal antenatal anxiety predicted behavioural and emotional problems in children (O'Connor et al. 2002). Anxiety and depression were assessed at 18 and 32 weeks gestation and eight weeks and eight, 21 and 33 months postpartum; children's behaviour was assessed at 47 months. The study found that maternal antenatal anxiety significantly predicted children's behavioural and emotional development at four years, even when the effects of postnatal anxiety were controlled for. This led the authors to suggest that maternal anxiety might affect fetal programming, resulting in later behavioural and emotional problems (O'Connor et al. 2002).

Findings suggest that women's emotional state during pregnancy, which affects the functioning of her HPA-axis, can also affect the neurobiological structures of the emerging fetal HPA –axis (Marcus et al. 2010; Monk 2001). Overactivity of HPA-axis functioning, a consequence of anxiety and stress, results in elevated levels of adrenocorticotrophic hormone (ACTH), which regulates the production of cortisol (Monk 2001). Maternal cortisol appears to cross the placenta and thus may affect the fetus and disturb ongoing developmental processes (Van den Bergh et al. 2005b). Data suggest that fetal exposure to high levels of cortisol may influence brain development (Monk 2001).

The adverse effects of maternal stress and anxiety on fetal brain development can extend well beyond the early years of life into adolescence. A prospective study of the effects of antenatal anxiety on the cognitive functioning of 57 adolescents, with a mean age of 15 years found that those adolescents whose mothers had experienced stress and anxiety in early pregnancy performed more

impulsively and made more errors in cognitive functioning and intelligence tests than those whose mothers were psychologically well (Van den Bergh et al. 2005a). The authors believed that this was due to poor maternal psychological health negatively affecting fetal brain development and programming between 12 and 22 weeks of pregnancy.

2.5 Impact of poor maternal mental health on the neonate

Detrimental effects of poor maternal emotional and psychological health may extend beyond pregnancy and birth, affecting short and long-term psychological and physical outcomes for babies and children.

Increased newborn cortisol levels

Maternal stress and anxiety in the antenatal period can lead to premature birth (Glynn et al. 2001). Earlier discussion has identified elevated levels of ACTH, the cortisol regulating hormone, in newborn infants of depressed mothers. One UK study measured the saliva cortisol content in a group of 45 preterm babies, born before 32 weeks gestation, to see if the early stress experienced by these premature babies had an effect on the babies' own cortisol response at a later date, as high levels of cortisol are associated with higher levels of stress (Glover et al. 2005). The researchers found that the preterm babies had four to seven times higher levels of cortisol than expected fetal levels at the same gestational age and continued to have higher than normal levels at four months of age (when measured during the stress of routine immunisation), showing that early stress may continue to have an effect on the baby's own cortisol stress response (Glover et al. 2005). The authors suggested that larger studies need to be conducted to strengthen these findings.

The increase in cortisol production can also continue, affecting long-term cortisol production in children (O'Connor et al. 2005). Findings from an exploration of the links between antenatal anxiety and HPA-axis functioning in a group of 74 ten-

year olds found that maternal stress was significantly associated with increased cortisol levels in the ten-year old offspring of distressed mothers, suggesting an increased vulnerability of these children to psychopathology (O'Connor et al. 2005a).

A longitudinal pilot study used the BDI to monitor the depressive symptoms of 415 women in the USA at three time points during pregnancy (28, 32 and 37 weeks gestation) and again at birth and compared the results with ACTH levels in the cord blood of the newborn, together with cortisol levels (Marcus et al. 2010). The study found that infants born to women with high depression scoring had significantly elevated ACTH levels at birth. Depression was assessed as low, intermediate and high depression, based on a mixture growth curve approach proposed by Nagin (2005) which identifies different trajectory patterns of depressive symptoms based on BDI scores. On neonatal examination these infants were found to be hypotonic and demonstrated elevated responses to auditory and visual stimuli (Marcus et al. 2010).

Impaired maternal-infant interaction and newborn neurobehavioural responses

The links between maternal anxiety and depression in pregnancy and postpartum and subsequent poor maternal-infant interaction were discussed earlier in this chapter. As well as depression affecting the mother's response to the infant, studies have shown that infant responses to the mother can also be affected by maternal depression.

In a study of the facial expressions of 40 neonates of mothers with depression, Lundy et al. (1996) found that babies of depressed mothers were more irritable in neurobehavioral examinations. They displayed fewer and much flatter facial expressions in response to happy faces, less imitative behaviour, less face to face interaction and were more fidgety than babies of contented mothers. Other studies have demonstrated that babies born to mothers displaying depressed symptoms showed less motor tone and displayed more irritability and lethargy (Abrams et al. 1995).

A study in the USA assessed 80 women in mid pregnancy and shortly after delivery to determine the effects of maternal depression on neonatal behaviour (Diego et al. 2005). The authors found that infants born to women displaying depressive symptoms in either pregnancy or postpartum (as measured by the CES-D) exhibited greater indeterminate sleep (found to relate to later cognitive functioning), while, consistent with the findings of Field et al. (2005) the newborn of mothers who were depressed only in the antenatal period displayed more stress behaviours and cried frequently. Two weeks after birth babies born to women who showed signs of postnatal depression had much lower scores on the Brazelton Neonatal Behaviour Assessment Scale (NBAS) (Brazelton and Nugent 1995), which measures newborn developmental abilities (Diego et al. 2005). The findings illustrate the importance of recognising the differences that the timing of poor maternal psychological health can have on child development.

2.6 Impact of poor maternal mental health on children

Maternal emotional and psychological ill health can continue to affect children in the longer term. Depressed mothers have been found to be disengaged from their children leading to insecure child attachment; they also tended to be unresponsive or hostile, provided poor role modelling and demonstrated inconsistency in their practice of discipline, all of which put the child at risk of behavioural problems (Gelfand and Teti 1990; Tronick and Weinberg 1997; McMahon et al. 2001).

A meta-analysis of 33 studies conducted in the US, Canada, UK and New Zealand, which focused on maternal mood and child behavioural problems, identified a significant moderate correlation between maternal depression and behavioural problems both in pre-school and school-age children (Beck 1999). The combined sample size for the study was 4,561 mother-child dyads and these consisted of children with ages ranging from 1 to 18 years old. Although the effect size

(r ranged from 0.29 when weighted by sample size to 0.75 when unweighted) supported the need for further research, the importance of recognising maternal depression early was also highlighted.

2.7 Long term impact of poor maternal health on adolescents

Maternal depression and anxiety can affect the health of offspring for many years after the occurrence, extending into young adulthood. The effects of depressive mood appear to impact regardless of whether it is experienced in the antepartum or postpartum period.

A longitudinal study of the effects of exposure to maternal depression postpartum on 13 year-old adolescents was conducted in the UK (Halligan et al. 2007). Women were assessed for depression by a clinical interview at two months postpartum and again at eighteen months and five, eight and thirteen years after giving birth. Children were assessed by diagnostic interview at eight and thirteen years. The authors found that at 13 years, adolescents of mothers who suffered from depression (n=53) were more likely to suffer from a depressive disorder themselves. The incidence was greatly increased if the mother suffered from recurrent later depressive episodes, although there were specific risks associated with postnatal maternal depression (Halligan et al. 2007).

The importance of recurrent maternal depressive episodes was confirmed in a UK study of the different effects of antenatal and postpartum exposure to maternal depression on adolescent outcomes (Hay et al. 2008). The study showed in a sample of 121 families that neither antenatal nor postnatal depression (as assessed by a clinical interview schedule at 20 and 36 weeks gestation and 3 and 12 months postpartum)) had clear effects on the psychopathology of adolescents (as assessed at 11 and 16 years by a psychiatric interview) , although there was a clear link between successive maternal depressive episodes (as assessed perinatally and at 4, 11 and 16 years after giving birth) and problems in the

cognitive and behavioural development of the offspring. There were, however clear links between postnatal depression and the cognitive development of boys (Hay et al. 2008).

A prospective UK cohort study of 151 women and their children followed from pregnancy to 16 years after birth to examine the long-term effects of mothers' depression on their adolescents showed that adolescents who were exposed to maternal depression during pregnancy were four times more likely then those not exposed to be depressed at age 16 (Pawlby et al. 2009). Every one of the 14% of adolescents diagnosed with a depressive disorder at 16 years had been exposed to maternal depression. As might be expected, however, information on all participants recruited reduced over the time span until finally full information was available for 127 dyads, limiting the generalisability of the findings.

Maternal anxiety and stress have also been shown to affect not only the psychological health but also the physical health of offspring. In a nationwide Danish study of a cohort over 66,000 women assessed for exposure to stress during pregnancy and postpartum, maternal life stress during pregnancy was associated with an increased risk of a wide range of clinically diagnosed childhood diseases such as infections, eye and ear disorders and diseases of the respiratory, digestive, skeletal and genitourinary systems (Tegethoff et al. 2011).

Summary

The chapter has shown the far reaching impact that maternal perinatal depression can have on the family as well as the mother herself. Maternal depression can affect a woman's ability to interact and communicate effectively with her newborn child, leading to potential developmental difficulties for the child in the future. The mental health and wellbeing of partners can also be affected by depression in the mother, resulting in an accumulation of social, financial and psychological difficulties for the family unit. Maternal depression is also inextricably intertwined with poor social circumstances, poverty, abuse and

harmful health choices which can again result in adverse outcomes for the children of the family.

The chapter has shown how maternal emotional difficulties in pregnancy and postpartum can clearly affect the wellbeing of the fetus in utero and developmental outcomes for the child as well as the mothers own quality of life. Anxiety and depression in pregnancy appear to affect fetal growth and development at all stages, the outcome being dependent on the timing of the influence. Moreover the effects continue to impact on the newborn, infant and adolescent for many years. Postpartum poor maternal emotional and psychological health can further influence the ongoing behavioural development of the child.

More research needs to be carried out to determine how the timing, duration and intensity of stress and anxiety are related to neurobehavioral development (Van den Bergh et al. 2005a; Van den Bergh et al. 2005b). However sufficient evidence is available to highlight the need to develop ways of identifying and managing stressful events in order to prevent maternal anxiety and emotional ill health from impacting on fetal and infant outcomes (Glover and O'Connor 2006).

A greater understanding of the complex factors impacting on women's emotional wellbeing during pregnancy may help professionals to support women and prevent the impact that anxiety and depression has on the mother and her family. Knowledge of women's emotions in pregnancy and postpartum and the way they process these, together with an understanding of any possible relationship with a current or new onset of depression are important areas to address. Glover and O'Connor (2006), reviewing evidence of the interaction between maternal stress and anxiety and fetal and neonatal risk , identified an immediate need to screen for maternal emotional problems during pregnancy in order to enable appropriate interventions to be put in place. The aim of this study is to explore an alternative way of looking at maternal emotions to assist identification and management of perinatal mood disorders.

3. EMOTIONS AND EMOTIONAL PROCESSING

Introduction to chapter

Childbirth can trigger a variety of feelings and emotions in a woman, be it on reflection, a life-enhancing or traumatic event. However it is too complex and beyond the scope of this study to find a definition of emotion that embraces the multifaceted psychological processes that a woman may experience. Instead this chapter explores some of the stressors impacting on women during pregnancy, birth and postpartum creating potentially high levels of emotions to be appraised and managed. Concepts such as emotional awareness, regulation and expression which are associated with the way women might deal with their emotions are explored, as well as the personality trait of alexithymia which refers to difficulty recognising and dealing with emotions. The chapter concludes with an exploration of a number of approaches to emotional processing and a detailed account of the stages involved in the emotional processing model described by Baker (2007). This formed the foundation for the development of the Emotional Processing Scale which was used for the first time in this study to measure women's emotions over the childbirth continuum.

3.1 Emotions in childbirth

Emotions are an essential part of being human, enabling people to relate to each other and form relationships (Baker 2007). The greatest stimuli generating emotional experience and expression come from interaction with others (Strongman 1998). Emotions are essentially what make people unique, with an individual's life experiences, challenges and interpersonal relations characterizing a unique emotional response to life (Kuppens et al. 2009). Successful management of emotions is about processing stressful life events appropriately such that they do not have any lasting negative effects on everyday life (Rachman 2001). Pregnancy and birth can be significantly stressful events, inducing feelings

of helplessness and fear in some women (Vythilingum 2010). Pregnancy and parenthood generally require a woman to make enormous adaptations to her lifestyle and routines provoking potentially high levels of stress and anxiety (DiPietro et al. 2004). To maintain psychological wellbeing, therefore, women need to be able to appropriately process the emotions provoked by pregnancy and birth events.

Childbirth is perceived as emotional whether women experience a happy and positive occasion or a deeply traumatic event (Edwards 2009). During the relatively short period of pregnancy, labour and the postpartum period, women may experience a range of emotions that at other times may be managed more gradually over a much longer period of time (Raynor and England 2010). Internationally, authors have identified a wide variety of pregnancy-specific stimuli that trigger women's emotional experiences, potentially creating stress in pregnancy and the perinatal period (Da Costa et al. 1999; DiPietro et al. 2004; Lobel et al. 2008). These include changes to body image, physical symptoms, relationship difficulties, anxiety about the birth and concerns about the health of the baby (Da Costa et al. 1999; Lobel et al. 2008).

There is also a growing belief among researchers that stress uniquely related to pregnancy creates a more powerful psychological arousal than general stress (DiPietro et al. 2004; Lobel et al. 2008). A study of 279 pregnant women in the USA, compared the effects of pregnancy-related stress (such as physical symptoms, parenting concerns and anxiety about the birth) and general life-related stress (such as death of a loved one, involvement in an accident, losing a job) on birth outcomes (assessed as gestational age at delivery and birth weight) (Lobel et al. 2008). The women completed validated self-report scales which measured a variety of pregnancy-related stress factors, general sterssful life events and health behaviours at three stages in pregnancy and results showed that pregnancy-specific stress was associated with poorer health behaviours and was a stronger predictor of adverse birth outcomes such as pre-term delivery

than general stress (Lobel et al. 2008). The authors suggested that the immediacy and context of pregnancy-specific stress made its effects more intense.

The findings of this study are in agreement with those of much earlier studies that have demonstrated that as pregnancy itself presents unique psychological and social challenges, failure to measure these pregnancy specific sources may lead to an underestimation of maternal distress (Zajicek and Wolkind 1978; Carlson and LaBarba. 1979). What is missing from the study by Lobel et al. (2008), however is consideration of the influence of time on stress triggers and whether the impact of pregnancy-related stress and general stress differ depending on when in pregnancy they occur. This is particularly important in view of evidence suggesting that stress responses vary across pregnancy (Glynn et al. 2001; Glynn et al. 2004).

The timing of stress in pregnancy can be important in determining the response and management of the experience (Glynn et al. 2001; Glynn et al. 2004;). A small study of 40 women who were involved in the acute stress of an earthquake in California during pregnancy or within six weeks of giving birth, mentioned earlier, used regression analysis to show that the effects of stress (as measured on a life-events inventory) experienced in earlier pregnancy were more pronounced that stress experienced later and were more likely to shorten gestational age (Glynn et al. 2001). The authors postulated that women appeared to have greater protective mechanisms against stress as pregnancy progressed.

The results of another study undertaken in the USA agreed with these findings (Glynn et al. 2004). Two hundred and ninety two women were assessed at 32 weeks gestation and six weeks postpartum by responding to a life events questionnaire identifying stressful events occurring over the period of pregnancy and after. This questionnaire was adapted for pregnancy from one used by Golding (1989) in a large epidemiological study of mental health. Women were asked to assess the impact of all life events happening between conception and

32 weeks gestation and between 32 weeks gestation and six weeks postpartum. Results showed that emotional appraisal of stressful events appeared to change as pregnancy progressed, with events occurring later in pregnancy being perceived as less stressful than those happening earlier (Glynn et al. 2004). Although the findings of this study are consistent with the aforementioned work (Glynn et al. 2001), arguably an element of recall bias could have affected results as there was a greater time lapse between the recall of events that happened in early pregnancy than between the late pregnancy stessful event and the recall. It is possible that the longer time lapse caused a magnification of the intensity of the stress experienced.

Despite seeming to be less affected by stressful events in later pregnancy, women appear to be more aware of threats posed by stressful triggers at this time, however. A UK study assessed the ability of primiparous and multiparous women to encode facial expressions of emotion (which might invoke levels of happiness, fear or anxiety) in the first trimester of pregnancy and again at the end of the third trimester (Pearson et al. 2009). Using emotional reactions to the facial expressions of 60 male and female faces as a measure of emotional processing and the Clinical Interview Schedule [CIS-R] (Lewis et al. 1992) to determine symptoms of anxiety at 10 to 12 weeks gestation and again around 37 weeks gestation Pearson et al. (2009) found that women's ability to encode emotional facial expressions, especially fearful and angry ones, was improved in late pregnancy and those women with increased anxiety had a greater ability to encode faces that signalled a threat . This could not be explained by increased levels of anxiety in later pregnancy as levels were higher in earlier than late pregnancy. Although unable to provide a causal explanation for this from their findings, the authors theorised that the greater recognition of faces which could signal a threat might be due to an increasing ability to protect the unborn infant from harm.

Physical and psychological changes occur throughout the course of the childbirth continuum and emotional upheaval may begin very early in pregnancy as a

woman struggles to reconcile her feelings and emotions with social and cultural norms (Choi et al. 2005). Although the growing pregnant body is acceptable in most cultures as being evidence of the highly valued reproductive role (Usher 1989), for some women, their changing body image can provoke negative emotions (Skouteris et al. 2005).

In a meta-analysis of 77 international correlational and experimental studies exploring media depictions of the ideal thin body and body image disturbance in women, Grabe et al. (2008) found that self perception of body image could have deep emotional implications for women, especially those dissatisfied with their increasing size, culminating in lack of self-esteem and depression. The meta-analysis included predominantly white English speaking cultures and cannot therefore be generalised to a wider ethnic population, however.

A longitudinal prospective study of 128 Australian women explored normative body image changes during pregnancy and examined factors such as depression, perceived societal pressure to be thin, and self-consciousness that might lead to body dissatisfaction (Skouteris et al. 2005). One hundred and twenty eight women completed the Body Attitudes Questionnaire (BAQ) (Ben-Tovim and Walker 1991), body contour and figure rating scales, measurements of physical shape and cultural pressure scales and the BDI (Beck et al. 1961) retrospectively three months prior to pregnancy and again early in the second trimester and early and late in the third trimester (Skouteris et al. 2005). The authors found that most women adapted to their changing body shape over time but experienced higher levels of dissatisfaction with their body image in the early to mid trimesters of pregnancy than in late pregnancy, although in general they tended to feel less attractive in late pregnancy than before they became pregnant. Depressive symptoms, reported at 16 to 23 weeks gestation, were found alongside cultural pressure and teasing from others to predict a decrease in feelings of body attractiveness and an increase in feeling fat (Skouteris et al. 2005). Caution must be applied when considering these results, however, as the high education levels and stable relationship status of the participants prevent

generalisation of the findings to a more diverse, younger, less socially stable population. The retrospective recall of pre-pregnancy perceptions of body image may also contain an element of inaccuracy.

A further criticism of the aforementioned study could be that the measurement scales used were designed for use with a non-pregnant population and may have focused on aspects of body image not relevant to women in pregnancy and postpartum. In contrast, however, a number of small qualitative studies have explored body image from the point of view of pregnant women (Earle 2003; Clark et al. 2009; Rubin 2006). A qualitative study of 17 primiparous women in the UK interviewed in-depth in early and late pregnancy and at six to 14 weeks postpartum to explore their experiences of body shape changes found that women adopted a pragmatic approach to their changing shape, which although at times disturbing to them was conceptualised as being temporary (Earle 2003).

The findings of a small qualitative study of 20 Australian women, 10 of whom were interviewed in early pregnancy, 10 in late pregnancy and 10 postpartum, to gain insight into their body-related experiences and mood during pregnancy and the postpartum period supported these findings (Clark et al. 2009). Phenomenological and thematic analysis revealed that women adapted well to body changes during pregnancy, viewing them as positively related to increased body functionality in developing their offspring and their socially acceptable role as expectant mothers. Postpartum, however they were less satisfied with their body shapes as the social acceptance of their increased body size in pregnancy no longer protected them (Clark et al. 2009). The women reported more emotional lability during pregnancy and less so postpartum, although they did not feel that these mood swings related to changing body image. A limitation of this study, however, might be that the cross-sectional nature of the data gathered meant that there was no way of relating feelings about body image across the childbirth continuum. Following the same group of women and interviewing them at different times in pregnancy and postpartum would contribute to a greater understanding of changing perceptions of body image.

Emotions can be affected by women's physical and psychological wellbeing during pregnancy and postpartum. A cross-sectional study of 243 women from four antenatal clinics in Taiwan, which explored the impact of nausea and vomiting in the first trimester as a stressor during pregnancy, found that symptoms of nausea and vomiting were associated with perceived stress (as measured on the Perceived Stress Scale (Cohen et al. 1983) antenatally (Chou et al. 2008). This was similar to the findings of a longitudinal study of 282 primiparous and multiparous Israeli women which explored differing emotions experienced during the three trimesters of pregnancy (Rofé et al. 1993). Using the Repression-Sensitization Scale (Byrne et al. 1963) to measure emotional responses, the study found that the major causes of women's emotional experiences in the first trimester were physiological changes associated with early pregnancy (for example nausea and vomiting). As the labour and birth approached, nervousness and fears surrounding the birth and its consequences had the greatest effect on emotions (Rofé et al. 1993).

In a chapter looking at the 'emotion work' of women during pregnancy and birth, Edwards (2009) purported that the process of birth, which involves interaction with health professionals during pregnancy, labour and birth may evoke strong complex emotional responses in some women as they may have to deal not only with their own emotions evoked by events but also emotions arising because of demands of obstetric practice which may be in opposition to their personal wishes. A desire to appear reasonable and responsible in complying with decisions about their care made by midwives and obstetricians may hide true feelings of uncertainty, panic or resentment and women may mask their true emotions in order to ensure that they protect themselves and their baby and receive the care they desire (Edwards 2009). The author believed that this may be due to women's 'emotion work' being entrenched in complex interactions between societal values, social structures and birth practices that place constraints on all involved and ultimately prove detrimental to the wellbeing of the woman. Theses observations are supported by a very small study of 10 low-

risk women in the UK which undertook observational fieldwork followed up by in-depth interviews to explore the emotions experienced by women during labour (John 2009). A great deal of the emotion work of women was found to relate to their interaction with their midwife so that their birth experience would be positive.

A qualitative study of 50 women in the UK looked at the thoughts and emotions of women during labour and birth to determine how they might be associated with the development of posttraumatic stress disorder [PTSD] (Ayers 2007). Three months after birth 25 women, identified as having symptoms of PTSD through scores above a recognised threshold on two PTSD rating scales at one and six weeks after birth, were matched with a sample of women with no symptoms for parity, age and obstetric events (onset, type of delivery, analgesia, blood loss, complications) and all were interviewed about their birth experience. The aim of the interview was to elicit information about birth experiences, their responses to events, support and stress experienced in order to examine their thoughts and emotions. Women from both groups expressed feelings of pleasure, happiness, relief as well as apprehension, frustration, losing control, not coping and fear for their lives, although more women with symptoms of PTSD reported feelings of panic, and only they expressed anger and annoyance (Ayers 2007). The author concluded that, although associations between PTSD and emotions could not be made, it seemed likely that the symptoms of stress disorder postpartum may have led retrospectively to an interpretation of their emotions in a more negative way. The emotions identified above were confirmed by the ethnographic study mentioned above (John 2009) which found that women experienced wide swings of positive and negative emotions throughout the birth experience, ranging from fear of pain, birth and death to elation and relief following a safe birth.

Similar emotions have also been reported by women undergoing caesarean section. From 1,238 responses to a large postal survey of Scottish women's satisfaction with caesarean section, 521 women who added comments about

distress experienced at the time identified emotions such as shock, panic, loss of control, helplessness, confusion, ignorance of what was happening, disappointment and fear for own life and baby's (Porter et al. 2007). The questionnaire was sent to women who had experienced a caesarean section between 5 and 20 years previously and arguably the time interval may mean that women inflated the distressing aspects of experiences, and emotions became more negative over time, but the fact that the emotions have been confirmed by later qualitative studies suggests the legitimacy and strength of these emotions (Ayres 2007; John 2009).

Then term 'maternal distress' has been used to describe an aspect of emotional wellbeing which includes feelings of isolation, unreadiness and loss experienced by women in the postnatal period (Barclay et al. 1997). A recent study undertook a concept analysis of 25 international studies which explored maternal psychological and emotional distress, to gain a greater understanding of the emotional responses of women during the transition to motherhood (Emmanuel and St John 2010). The authors found that, rather than reflecting the medical model of distress as dysfunction, maternal distress had a more multi-dimensional perspective that ranged from normal common feelings of stress to those indicating a mental health problem. Four domains of stress/distress were identified (stress, adaptation, control and connection) relating to a woman's responses to her changing role, body, relationships and circumstances and to the demands, challenges, losses and gains associated with becoming a mother. A woman with low maternal distress would experience some anxiety and worry initially, but would adjust well to her new role, gain control of her life and maintain connections with her baby, partner, family and friends: the opposite would be true of those women experiencing emotional distress (Emmanuel and St John 2010). The authors recognised that use of the concept 'maternal distress' which has only been popular since the 1990s may have been limiting and suggested that understanding of women's emotional wellbeing in pregnancy and postpartum might be extended further if the focus included terms found in earlier literature.

The transition to motherhood can be regarded as a major life event, making women potentially vulnerable to a wide range of emotions (Darvill et al. 2010). Adaptation to the new role of mother can impact greatly on women's emotional state as role conflicts come into play and they experience a variety of emotions, ranging from happiness and elation to anxiety, doubt and depression (Barclay et al. 1997; Nicholson 1997; Mercer 2004; Wilkins 2006). As a result, up to 70% of new mothers experience postnatal blues, sadness or anxiety after giving birth (O'Hara and Swain 1996). Over the past two decades there has been an increase in the number of women-centred studies exploring the emotions of motherhood described by women themselves (Barclay et al. 1997; Nicolson 1998; Nelson 2003; Choi et al. 2005; Darvill et al. 2010). These studies being qualitative in approach are relatively small in size, limiting their findings. However much can be learnt from the words and feelings expressed by women themselves.

A synthesis of nine qualitative studies and 145 women in total (comprising four grounded theory and five phenomenological approaches) that explored different aspects of the transition to motherhood found that becoming a mother caused significant emotional and adjustment problems for most women (Nelson 2003). Reviewing the findings from the nine studies, the author concluded that the early postpartum months were physically and mentally exhausting, resulting in a time of uncertainty and emotional lability for the mother. Whilst there was consistency in the findings of the studies considered they were limited by geographical location to areas of North America and Australia. As a result the findings can only be generalised to a white western population and interpretation cannot consider racial and cultural diversity and the impact cultural mores might have on the emotional transition to motherhood.

A UK study by Choi et al. (2005) suggested that emotions experienced by women postpartum related to the unrealistic expectations they had of motherhood. In-depth interviews with a group of 24 non-depressed women revealed feelings of anger, betrayal, shock, panic, inadequacy and uncertainty as the women realised

that the reality of motherhood was far removed from the myth perpetuated by society. These feelings were compounded by the need to be seen by others to be coping well with the new role (Choi et al. 2005). These conflicting emotions reflected those identified in earlier studies (Barclay et al. 1997; Nicolson 1998).

Feelings of inadequacy, uncertainty and frustration were reflected in a small qualitative study of first-time mothers' transition to parenthood in the UK (Wilkins 2006) where women's sense of moving from being an expert in their former roles to a novice in the role of mother evoked strong emotional challenges to both the women and her family.

Darvill et al. (2010), in a study which explored the psychological impact of motherhood on 13 first time mothers in the UK, interviewed at six to 15 weeks postpartum, found that the roller coaster of emotions described by the women left them at first drained of energy and out of control of their lives and later more confident and less emotionally and physically stressed. Again the transferability of the results of these qualitative studies (Choi 2005; Wilkins 2006; Darvill 2010) is limited because of the homogeneity of the samples which were for the most part white, English speaking. Greater cultural diversity would enable a greater understanding of the range of emotions experienced and expressed by women from more diverse backgrounds.

A study of 69 Canadian first- time mothers recruited through mothering sites on the internet and parent education classes and interviewed at 34 weeks gestation and again at four months postpartum to determine whether a realistic orientation towards motherhood would assist postnatal adjustment found that the majority had experienced unexpected events after the birth which evoked negative emotions (Churchill and Davis 2010). The authors found that those women who had considered the negative aspects of motherhood and the difficulties they might encounter (as assessed by the Orientation to Motherhood Scale, developed by the authors) showed less depressive symptoms postpartum (as measured on the CES-D) than those who had given little thought to the

realities of postnatal adjustment. The findings of this study may be limited, however, as arguably it could be construed that as the women were either accessing mothering sites on the internet or attending antenatal preparation classes they were actually more concerned about motherhood and therefore more motivated to prepare themselves than the general population of first-time mothers.

In contrast to these findings a recent quantitative study which explored the impact of having a baby on the wellbeing of 19 women in the Netherlands found little evidence of the negative impact of the transition to motherhood on women (Hoffenaar et al. 2010). Women completed questionnaires containing the Day Reconstruction Method [DRM] (Kahneman et al. 2004), which assessed recollections of emotions experienced on the previous day, and several measures that captured wellbeing and life satisfaction together with the EPDS, to measure depression symptoms at 36 weeks gestation and four weeks postpartum. Results showed that over an eight week antenatal – to - postpartum time span women adapting to their new mothering role generally coped well and none scored over the threshold for probable depression. This was a very small study, however, which was biased towards predominantly well educated women in full-time employment which prevents any firm conclusions about the emotional wellbeing during the transition to motherhood being drawn.

A review of the literature demonstrated that pregnancy, birth and postpartum can be a time of challenging emotional and psychological adaptation for women. The way in which a woman manages emotions associated with childbirth will depend largely on the support she has, her personal perceptions of events and her appraisal of the experience and environment (Da Costa et al. 1999). This appraisal will be individualised and based on experience, with multiparous women being influenced by their previous birth experiences and primiparous women being influenced perhaps by fear of the unknown or narratives passed on by others.

Each step on the childbirth continuum can potentially evoke a complex array of emotions that might impact on a woman's physical and psychological wellbeing. For the most part the triggers invoking these emotions may be difficult to avoid. Therefore an understanding of how these emotions are processed is vital to professionals to help support women at this vulnerable time.

3.2 Experiencing and managing emotions.

The review of the literature above has shown that women experience a complex array of emotions during pregnancy and birth. Psychologists agree that whether a person's culture and background dictate that they encourage or suppress their emotions, everyone needs to exert some element of control or management over them (Lane et al. 1990; Baker 2007). To achieve this people must have an awareness and insight into their emotions, and be able to regulate and express them appropriately. These elements are essential to the concept of emotional processing (Rachman 2001; Baker 2007).

Emotional processing is about an interplay of a variety of components that make up the complex nature of emotions in such a way that a distressing experience is turned into a non-disturbing one (Dorset Research and Development Support Unit 2003). Emotional awareness, regulation and experience each form an integral part of the process of emotional processing (Baker et al. 2007b). Before discussing theories of emotional processing and the Emotional Processing Scale (Baker et al. 2007b) used in this study it will be valuable to explore some of the concepts involved in the complex process of dealing with emotions.

Emotional awareness

Emotional awareness is an integral part of emotional processing. Not only do humans experience emotions but they are aware they are experiencing them, thus making it possible for them to put their feelings into words and express and

control them (Lane et al. 1990). To repress an awareness of harmful experiences can be detrimental to psychological and physical health (Lane et al. 1990).

Awareness is central to Gestalt theory which has made an important contribution to the understanding of emotions. Gestalt theory, developed at the beginning of the 20th century by German psychologist, Max Wertheimer, is about integrated wholeness and oneness and essentially sees the whole of something as greater than the individual parts that make it up (Cutting 1989). Gestalt is a psychology term which means 'unified whole' and relates to how individuals perceive things in their environment or context as a total unit of meaning or a visual whole (Korb et al. 2002). For example blank spaces and margins on a written page help to define the words that are written and are integral to the whole perceived by the reader (Korb et al. 2002). The natural process of Gestalt formation occurs when an individual shows awareness of self, the environment and the relationship between the two (Korb et al. 2002)). Gestalt formation concentrates on the 'here and now' rather than past experiences as any past experiences or anticipated events in the future diminish the amount of energy an individual can apply to the present (Cutting 1989, Korb et al. 2002). Gestalt therapy, which has emerged from an understanding of Gestalt theory, focuses on how someone experiences an event at that current time rather than trying to make sense of it through an understanding of the past. Awareness of emotions, sensations, thoughts and bodily feelings is crucial to this understanding (Rock and Palmer 1990). When applied to emotions Gestalt is about experiencing the whole emotion rather than the somatic components that make up that emotion (Baker 2007). Some individuals fail to do this and instead concentrate on the physical sensations accompanying the emotion, such that fear is experienced as pain in the stomach or a fluttering in the chest which the person interprets as a physical complaint rather than the emotion of fear.

Although Gestalt theory gave little attention to emotions per se (Reizenzein and Schonpflug 1992) the theory is important when applied to an understanding of the management of emotions because it suggests that the experience of emotion

is much broader than being either good or bad. Rather the experience is the result of a stressor interacting with a number of idiosyncratic factors, determined by the individual's lifestyle and experiences (Kuppens 2009). In developing the Emotional Processing Scale emotional awareness was considered to be one element of a much wider field of conditions necessary for effective processing (Dorset Research and Development Support Unit 2003).

Emotional regulation and expression

Emotional regulation relates to the processes that influence what emotions a person will experience, and to when and how they experience and express them (Gross 1998). Based on the cathartic benefits of talking about emotions to aid exploration and resolution of conflicts postulated by Freud, emotional expression is considered crucial to the process of dealing with emotions as it helps to reduce the distress which might result from a disturbing experience (Gross 2002).

Expression of emotions can be verbal, such as shouting or crying or non-verbal as observed in facial expressions such as frowning. While some studies have demonstrated the benefits to both physical and psychological health and social interaction of outwardly expressing emotions, especially by writing them down (Pennebaker 1997; Gross and John 1998; Smyth 1998), others argue that as people are different, both expression and suppression of emotions can be appropriate depending on the characteristics of the person and the context of the trigger (Kennedy-Moore and Watson 1999). What can be harmful to wellbeing is poor regulation of emotions such that they are over expressed or excessively suppressed (Kennedy-Moore and Watson 1999).

Emotional intelligence

An essential component of emotional processing is the ability of an individual to recognise, understand and manage their own emotions, described as emotional intelligence (Goleman 1995). An emotionally intelligent person can accurately appraise their own emotions and those of others thus enabling them to handle relationships and situations effectively (Mayer and Salovey 1995). Emotionally

intelligent individuals are said to be particularly adept at regulating emotion. According to Mayer and Salovey (1997) emotional intelligence enables a person to assimilate emotional feelings, understand the information and recognise the meaning associated with them and consequently manage them. Moreover an emotionally intelligent person is also sensitive to the emotional responses of others and is therefore able to respond and negotiate with them appropriately.

Each individual is born with ability for emotional sensitivity, memory, processing and learning, which form the foundation of emotional intelligence (Hein 2005). This innate ability can be affected by life experiences and emotional examples learnt from parents, family, and teachers. Emotional intelligence is believed to develop with increasing age (Goleman 1995; Mayer and Salovey 1997). Emotional intelligence involves being able to take responsibility for one's emotions, turning negative emotions into positive learning experiences and aiding others to do the same (Goleman 1995). Definitions of emotional intelligence which refer to the ability to recognise and assimilate the meanings of emotions and process emotional information demonstrate how closely bound emotional intelligence and emotional processing are (Mayer and Salovey 1997). However, emotional processing is largely unconscious whereas emotional intelligence involves a much more conscious management of emotions (Dorset Research and Development Support Unit 2003).

Alexithymia

Each of the above concepts is essential to the processing of emotions. In contrast alexithymia relates to a personality construct characterised by an inability to identify describe and communicate feelings (Taylor et al. 1997). Alexithymia is a term used to describe people who have difficulty processing and regulating emotions (Haviland et al. 2000). It places sufferers at risk of physical and psychological disorders either directly or through unhealthy behavioural patterns which affect wellbeing (Lumley et al. 1996).

Considering the potential severity of the disorder many attempts have been made to develop assessment tools to measure alexithymia (Bagby et al. 1994; Haviland and Reise 1996). These measures, some of which will be discussed in greater detail in Chapter 6, have been designed to assess factors such as ability to recognise and label feelings, ability to describe and communicate feelings, and externally oriented thinking or pre-occupation with the details of external events, each of which reflects the main facets of alexithymia (Bagby et al. 1994). Other measures assess traits that describe people suffering from alexithymia such as distant, uninsightful, somatising, humourless and rigid (Haviland et al. 2000).

Although measuring deficits in emotional processing, alexithymia measurement scales such as the Toronto Alexithymia Scale [TAS -20] (Bagby et al. 1994) and the California Q-set Alexithymia Prototype [CAQ-AP] (Haviland and Reise 1996) are meant to be applied to individuals with this specific personality trait. In contrast the Emotional Processing Scale, which will be discussed later in the chapter, has been designed for those people who are mentally and physically healthy as well as patients with psychological and physical illness (Dorset Research and Development Support Unit 2003).

3.3 Models and approaches to emotional processing

Each aspect of emotions described above contributes towards an understanding of how people deal with feelings engendered by stressful events. The work of Baker and colleagues in developing the Emotional Processing Scale, draws together these concepts in trying to understand why some people manage to adapt well to emotional disturbances and continue with normal life while for others' failure to manage them appropriately impacts on their regular normal behaviour (Baker et al. 2007b).

The categorisation and management of emotions have been explored frequently in psychological discourses (Russell 2003). Knowledge of the regulation of

emotions is central to supporting and maintaining mental health, yet psychologists have struggled to understand even the most basic stages of emotion processing (Gross and Levenson 1997). Studies have shown that emotional inhibition or repression is implicated in pathogenesis (Gross and Levenson 1997) and consequently attempts have been made to understand the emotion-regulatory process further (Foa and Kozak 1986; Gross and Levenson 1997; Rachman 2001; Russell 2003; Baker et al. 2004).

In the cognitive theory of emotions the brain is perceived as an organ which stores and processes information. When an event occurs the brain retrieves stored information related to the event and reorganises the information storage depending on the acquisition of new relevant material. This is described as emotional memory (Ellsworth 1994) whereby memory is activated by a stimulus that matches some of the information in the memory bank. As a result, all other associated factors in the memory information bank are activated, including the emotion previously experienced. In other words, emotions are dealt with or processed according to previously stored information (Lang 1994). An example of this would be the emotion of fear which is represented in the memory in three ways: information about the stimulus that will cause the fear, information about the physiological and verbal responses to this stimulus and interpretative information about the meaning of the stimulus (Lang 1979). The concept of emotional processing was formulated in an attempt to understand how emotions are stored and remembered and to describe how that stored information is accessed and processed as a component of an individual's behaviour and response to a trigger (Lang 1979).

Perhaps the most important work for many researchers studying emotional processing is that of Rachman, a psychologist, who first described emotional processing in 1980 when he sought to identify the factors that promote and impede adaptation to emotional disturbances (Rachman 1980). He suggested that successful emotional processing occurred when emotional disturbances, which could be related to major life events or smaller daily events, were

absorbed, normal behaviour resumed and the individual could talk about the event or be reminded of it without experiencing distress (Rachman 1980). Unsatisfactory emotional processing was signalled by the persistence or return of intrusive signs of emotional activity such as nightmares, phobias and inappropriate expressions of emotion (Rachman 1980). Revising and developing the concept of emotional processing further in relation to post traumatic stress disorders Rachman proposed that emotional processing relates to the way a person absorbs and processes stressful or disturbing experiences so that they do not impact or intrude on the maintenance of everyday life and behaviour (Rachman 2001).

The identification of factors that impede or facilitate the processing of emotions is, according to Rachman (2001), based on both clinical observation and on probability based on psychological characteristics and personality factors. People with high levels of self-efficacy and competence are more likely to successfully process disturbing events than those with high levels of neuroticism, extreme introversion and a sense of incompetence (Rachman 2001). Those in a state of dysphoria, or experiencing illness or fatigue are more likely to encounter difficulties processing their emotions, and stimuli giving rise to these difficulties could be unpredictable or uncontrollable, leading to unfamiliarity or feelings of danger. With all the physical and psychological challenges of pregnancy women could be potentially at risk of experiencing difficulties processing their emotions.

Following the work of Rachman (1980), which led to a growing understanding of how emotions are managed, psychologists began to question what factors inhibit emotional processing and to seek ways of overcoming them. A number of studies explored aspects of emotional processing such as emotional awareness (Teasdale 1999, Corrigan 2004) and arousal (Hunt 1998), while others gave more emphasis to emotional appraisal and the impact of past memories and schemas (Foa and Kosak 1986, Stopa and Clark 1993) or to the regulation of emotions (Gross 2007).

Emotional awareness

While Rachman focused his discussion of emotional processing on anxiety disorders linked to discrete stimuli such as obsessions and phobias, Teasdale (1999) sought to explore emotional processing in relation to emotional states such as depression that were less closely linked to discrete stimuli. Hoping to illustrate the role of emotional processing in the prevention of relapse and recurrence of depression, he proposed that effective emotional processing, which would lead to changes in the ability of triggering cues to reactivate depressive symptoms at times of potential relapse, would be a useful coping strategy in response to dysphoric mood. His model of emotional processing emphasised the awareness and experience of emotions in psychotherapy and effective emotional processing focused primarily on changing emotional responses to internal affective events and thoughts so that they became short lived rather than the first stages of an escalating process (Teasdale 1999). Teasdale proposed a multi-level model of Interacting Cognitive Subsystems (ICS) which identified different types of mental codes related to different aspects of the emotional experience. Within his processing framework information processing within the cognitive subsystems involved the organisation and transformation of patterns of information in one mental code into patterns of information in another code. Some codes were simple and related directly to basic sensory data where explicit meanings were present (propositional code) while other codes, relating to the products of further processing of that data, were more complex, representing a higher order of meaning and deeper interrelationships extracted from the experience (implicational codes). Interaction between the two levels of coding was essential for meaningful processing (Teasdale 1999). In a person with depressive symptomatology there is a continuous creation and regeneration of implicational codes that reinforce depression. Successful processing relies on changing higher order meanings derived from experiences such that dysfunctional emotional schema are replaced by alternative models in the memory and when relevant emotion-related probe stimuli are activated the new

schematic models rather than the old will be accessed to determine emotional response (Teasdale 1999).

Emotional arousal

Hunt (1998) also explored the role of emotional processing in the management of depression, but rather than exploring emotional experience as Teasdale did the work focused on emotional arousal. The study, which involved 54 female and 53 male psychology students in the USA sought to explore whether emotional processing would help people recover after a depressing life event and whether emotional processing was an equally or more effective coping strategy than distraction or unemotional cognitive restructuring and problem solving (Hunt 1998). All participants, screened with the BDI (Beck et al. 1961) prior to inclusion to ensure they had no existing depressive symptoms, underwent a covert, moderately depressing negative mood induction, designed to anger and frustrate them, and were then randomly assigned to one of three groups and given an essay to write; an emotional processing group was encouraged to think in depth about the cause of their distress and any negative implications of the event, a distraction group were encouraged to refocus their attention on pleasurable events and a disputation group were encouraged to challenge the fairness and relevance of the mood induction they had received. Results showed that participants in the emotional processing group had better scores in a subsequent mood questionnaire, The Multiple Affect Adjective Check list (Zuckerman et al. 1983) than the other two groups, leading the author to conclude that emotional processing is a beneficial coping strategy in the face of depressing life events (Hunt 1998).

Emotional appraisal

Foa and Kosak (1986) developed the concept of emotional processing of Lang (1979) and Rachman (1980) to describe emotional processing in terms of fear networks. They defined emotional processing as the modification of memory structures that underlie emotions and described how corrective information can

be incorporated into these structures to redefine the memory in a more positive way (Foa and Kosak 1986) They proposed that emotions are represented by information structures in the memory and when an information structure that serves as a programme to avoid danger is activated then anxiety is triggered. When a trigger activates the fear network, information stored will then enter the conscious mind and processing of the fear emotion occurs. They maintained that two conditions underlie emotional processing and are required to reduce pathological distress. In the first place the cognitive structure underlying the pathological fear must be activated; in other words the person must be exposed to a fear trigger that causes distress in order that the information structure 'comes out of storage' and is available for modification. Secondly, new cognitive information that is incompatible with the underlying structure must be integrated so that a new understanding can be attained, causing a reduction in the fear (Foa and Kozak 1986). In contrast to Rachman, who described emotional processing as a mechanism whereby emotional responses decreased, Foa and Kosak (1986) believed that successful processing depended on the incorporation of new information about the fear into the existing structure which would challenge the fear structure, resulting in either a decrease or an increase in the fear. Thus emotional responses can decrease or increase with experience (Foa and Kozak 1986).

Emotional regulation

Gross (2002) approached the exploration of emotional processing by considering 'emotion regulation strategies' which focused on the way emotions are controlled in a positive or negative way, resulting in an increase or decrease in emotional disturbance or wellbeing. He proposed that different forms of emotion regulation have different consequences and identified two commonly used strategies, namely reappraisal resulting in a change in the way a situation is construed so as to decrease the emotional impact and suppression which involves concealing outward signs of inner emotional conflict (Gross 2002). In his model of emotional processing the sequence begins with a psychologically relevant trigger which can be external or internal to the individual followed by an

appraisal of an event and the emotional response, which might be automatic or controlled and conscious or unconscious (Gross 2002). What appears to be missing in Gross's model of emotional processing, however, is the actual emotion experienced after appraisal of the event and before the expression is controlled. In understanding better how reappraisal and suppression regulate the expression an awareness of the experience may be helpful.

3.4 Baker's model of emotional processing

The approaches to emotional processing discussed above have a number of commonalities. However each approach focuses solely on one or two specific factors that contribute to emotion management. None considered emotional processing as one comprehensive process commencing with the triggering event and the appraisal of it, leading to the experience of the emotion and the subsequent controlled expression. The work of Baker and colleagues (Baker et al. 2004, Baker et al. 2007b, Baker et al. 2010) sought to integrate all the processes found in the literature above (the trigger, past memories, appraisal, awareness, expression and control) into one complete and dynamic process.

Baker explored and further developed the work of Rachman (Baker 2007) ultimately developing a scale to measure those factors which inhibit successful emotional processing (Baker et al. 2007b) . According to Baker whose understanding of emotional processing grew from years of work as a clinical psychologist, the process of absorbing emotions relates not only to major life events such as relationship breakdown, loss of a loved one or loss of employment, but also to what could be perceived as minor daily events such as an argument or rudeness from a colleague (Baker et al. 2007b). Most people effectively process the majority of difficult life events but if for some reason they cannot (for example because of denial, or lack of emotional understanding) the memory of the event will still be emotionally charged, potentially causing distress in the future (Baker 2007). Signs of incomplete or impaired emotional processing

include repeated or intrusive memories of the stressful event, a re-living of the original emotions felt, pre-occupation with the event, poor concentration and inability to sleep. For emotional processing to work efficiently (in other words for normal uninterrupted behaviour to return after an emotional disturbance) three conditions must be met, namely, there must be evidence of emotional disturbance occurring, the disturbance must decline and there must then be a return to normal routine behaviour (Rachman 1980).

Although for the most part, people absorb disturbing emotional experiences satisfactorily, the time taken to process or absorb emotions effectively varies from person to person, depending on the degree of hurt experienced (Baker et al. 2007b). Eventually, however, after time, the hurt or pain recedes, mourning for bereavement subsides, a broken relationship ceases to cause concern or an insult no longer angers and the person is able to return to 'normal life' (Baker 2007).

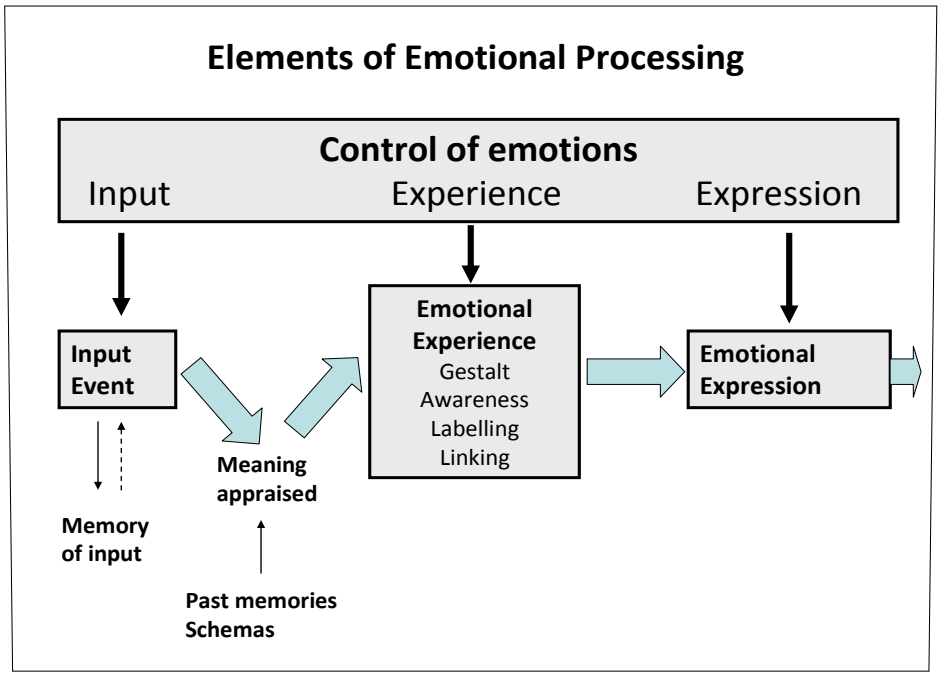
As shown, previous attempts to measure emotional processing had focussed on single aspects of emotions (control, regulation, intelligence, frequency, intensity and alexithymia), all of which were relevant but measured only a small part of the whole process. Baker and colleagues, in the UK, attempted to understand all the dimensions impacting on the normal sequence of emotional processing (2007b). In order to test an emerging theory that patients suffering from panic processed their emotions ineffectively (with the suppression or control of emotions leading to a panic attack) Baker and colleagues developed a measurement tool in the form of a questionnaire that attempted to measure those factors inhibiting the effective management of all aspects of emotions (Baker et al. 2004; Baker et al. 2010). Further details and discussion of this measurement tool, the Emotional Processing Scale (EPS) can be found in Chapter 6.

Underpinning the development of the EPS was the identification of a number of psychological mechanisms which can impede the processing of emotional events (Baker 2007). Baker suggests that the emotional processing system is rather like a second immune system that protects the body from emotional hurt and trauma

rather than physical harm. Effective emotional processing, which helps to dissolve negative experiences, is described as emotional healing (Baker 2007).

Emotional processing involves a number of components – registering, appraising and memorising the disturbing event, replaying the memories, interpreting the event, labelling and linking the emotions experienced in the light of that interpretation and expressing the emotion in a positive or negative way (Baker et al. 2003). Figure 2 illustrates this process.

Figure 1 Baker's model of emotional processing



(Reproduced with permission from Professor Roger Baker, Dorset Research and Development Support Unit)

Input event

Baker (2007) describes the trigger for the emotion as an 'input event'. This might be a traumatic event or a small slight or hurt. The person experiencing the input event immediately interprets or appraises it in the light of prior experiences, memories and personal values. Their appraisal consequently affects the way in which they experience the emotion, such that, for example, a comment from a colleague who has previously insulted that person may be interpreted in such a

way that it engenders feelings of anger which are experienced physically as tension, and a flushing of the face, and expressed through perhaps shouting and arguing (Baker 2007). The trigger event may be apparently small but is generally unpleasant for the person, and can be registered consciously or unconsciously. Problems can occur at this stage in processing if a person fails to respond to the event, thus causing a block in feeling emotion, or if too much feeling is engendered by the appraisal of the event

Appraisal of the event in the light of previous memories and schema is central to the emotional processing work of a number of authors (Foa and Kosak 1986, Gross 2002). Consistent with the model of emotional processing by Gross (2002), appraisal of the event is usually rapid, unconscious and based on past memory and is essential for the sequence of emotional processing to start (Baker 2007). Where Baker's model makes understanding of the process more comprehensive than Gross's, however, is consideration of the emotional experience that follows the appraisal.

Emotional experience

The second phase of emotional processing is characterized by the type of emotion experienced. As with the work of Teasdale (1999) where processing depends on the mental coding applied to patterns of information, Baker's model of emotional processing emphasises how the emotional experience is due to the unique interpretation each person places on the trigger event, depending on the appraisal (Baker 2007). Emotions, once appraised, are experienced as gestalt (such as fear, rather than the component bodily sensations of shaking and sweating) and awareness of the emotion and its component parts. Some people process this phase inadequately and fail to experience the gestalt or the psychological meaning of the emotion, however, and instead concentrate only on the somatic components that make up the emotion (Baker 2007).

With awareness of the emotion comes conscious or unconscious labelling of the emotion and a linking of the emotion to the event which caused it. According to

Baker this is an essential element of normal emotional experience (Baker et al. 2007)

Emotional expression

The third phase in the emotional processing model, and linked closely to the emotional experience is emotional expression, which can be through behavioural manifestation, bodily reactions or thoughtful contemplation (Baker 2007). Negative emotions are normally expressed through action (which can be direct, such as smacking a child who has angered its parents or indirect, by listening to music to calm down), speech (expressed directly perhaps by swearing at the perpetrator of the emotion or indirectly through crying alone) or through reflection (expressed directly by talking it through with a friend or indirectly by perhaps meditating). Expression can therefore constructively seek out a resolution or be destructive (Baker 2007).

Control of emotions

Embracing each stage of Baker's emotional processing model is the regulation of emotions. Consistent with the aforementioned work of Gross (2002), which showed that regulatory processes could affect the appraisal or the expression of the emotion, Baker's model shows that emotions can be controlled at each stage of the process (Figure 3.1).

In addition to the natural processing of emotions (input –› experience –› expression) individuals have different ways of regulating or controlling their feelings which appear to be dependent on factors such as childhood, personality and culture (Baker 2007). A child may be brought up in a family which naturally expresses emotions or conversely where a 'stiff upper lip' is required; peoples' culture may also have influenced their boundaries in relation to what emotional expression is acceptable. Control of emotions can occur at any stage in the processing sequence. Some people may make efforts to avoid any disturbing events thus preventing the input stage occurring. Others may try to avoid or stifle the experiencing of the emotion, becoming emotionally numb. Others

control the expression of their emotions (Baker 2007). It is important to be able to establish some element of control over emotions in order to interact appropriately with other people, but difficulties can occur if a person applies excessive control, thus inhibiting all feeling or conversely is unable to exert any control, allowing actions or words to cause discomfort to others (Baker 2007).

The way in which an individual processes their emotional experiences can thus be viewed as important with respect to how they facilitate their management of everyday life and could possibly prevent more serious problems developing in the future (Baker 2007; Russell 2003). Successful processing is indicated when a person is able to talk or be reminded about an event without experiencing distress, and normal behaviour can proceed without disruption (Rachman 2001).

The discussion above has demonstrated that Baker's model appears to present a more comprehensive and dynamic model of emotional processing than previous models and approaches as it provides a continuum, integrating all the phases identified by other authors, thus enabling the user to examine emotional processing as a more complete process. Arguably one thing that the model does not account for, which might make it more comprehensive, is that emotional processing can be conscious or unconscious and knowledge of that might help explain how emotions are processed at different stages (Santonastaso 2010).

Nevertheless Baker's model provides a more comprehensive understanding of emotional processing than previous work. What is also important about this model is that an Emotional Processing Scale (EPS) has been developed to assist the identification of deficits in processing at different stages in the continuum (Baker et al. 2010). The tool, which was refined from a 53-item self-report scale to the final 25-item scale used in this study, is explained in more detail in Chapter 6.

The EPS has been used to explore the emotional processing of several groups of people. Colorectal cancer, chronic back pain, fibromyalgia and anxiety disorders

have each been investigated using the EPS (Lothian 2002, Baker et al. 2004, Raleigh 2004). Cultural differences in the processing of emotions have also been examined (Santonastaso 2010). A cross-sectional study of patients suffering from colorectal cancer (Lothian 2001) showed significant differences in the emotional processing of patients with cancer as compared with a healthy control group and identified a pattern of emotional processing that was related specifically to the disorder. The cross-sectional nature of the study prevented any conclusions being reached, however, about whether poor emotional processing preceded the development of the cancer (Lothian 2002). A study comparing the emotional processing of 50 patients with panic disorder with healthy counterparts found, using the EPS as a measure, that the patients with panic disorder had greater awareness of their feelings, greater difficulty labelling them and exerted greater control over their emotional experience (Baker et al. 2004). Major cultural differences in emotional processing were identified between English, Italian and Japanese participants, and especially between east and west culture, in a recent study, which used the EPS to measure emotional processing (Santonastaso 2010).

Summary

The chapter has explored some of the challenging stressors impacting on the emotional experiences of women during pregnancy, birth and the postpartum period. Pregnancy-specific stimuli that trigger women's emotional experiences creating stress have been discussed, such as disturbance of body image, physical symptoms such as nausea and vomiting, emotions evoked by the birth and adaptation to the role of mother, and the timing of the stress has been explored.

Emotional concepts of awareness, regulation and expression, emotional intelligence and alexithymia, each of which contributes to an understanding of how emotions are processed, have been examined. The concept of emotional processing has been examined, exploring various models and approaches and looking in detail at Baker's model of emotional processing that underpins the exploration of women's emotions during pregnancy and postpartum. Stressful

events in life trigger an emotional response and in order to deal with the stresses of pregnancy, birth and postpartum effectively women must be able to process their emotions in an appropriate way. Knowledge of the steps involved in emotional processing and the barriers to successful processing will be beneficial to professionals planning the care of pregnant women.

The following section will discuss the aims and objectives of the current study, which has been designed to examine how women process the complex range of emotions experienced during pregnancy, birth and in the postpartum period and whether inadequate processing may lead to the development of postnatal depression.

PART TWO: STUDY DESIGN

Introduction

Part Two of the thesis introduces the Emotional Processing in Childbirth (EPIC) study. Chapter 4 outlines the rationale for undertaking the enquiry and explores the aims and objectives underpinning it. Chapter 5 describes study methodology, including sampling and recruitment, data collection and analysis. Study measurement tools, the Edinburgh Postnatal Depression Scale, The Emotional Processing Scale, the Short Form–36 and the Rosenberg Self-Esteem Scale, are explored and discussed in detail in Chapter 6.

4. AIMS AND OBJECTIVES OF THE STUDY

Introduction to chapter

The first chapter in Part 2 continues the discussion of perinatal depression and emotions to rationalise why an enquiry into emotional processing might inform an understanding of postnatal depression, leading the way to strategies for the earlier identification and management of this debilitating condition. The first part of the chapter discusses the study aims and the chapter concludes by outlining the individual study objectives.

4.1 Aims of the study

Despite pregnancy and childbirth being perceived as an emotional time in a woman's life course, a literature search failed to identify any studies which sought to understand the impact of how well women manage their emotions on their psychological wellbeing during the childbirth continuum. Emotional processing theory suggests that sudden, unpredictable, uncontrollable or dangerous stimuli are more likely to give rise to emotional problems (Rachman 2001). Childbirth, with its inherent challenges, would therefore seem ripe ground for emotional problems to arise.

Chapter 3 identified some of the emotional challenges facing women during pregnancy, labour and postpartum. It seems logical to question whether the way a woman copes with her emotions at this time, including past memories and associated emotions invoked by her pregnant state, impact on the way she ultimately manages and recovers psychologically from the birth. This study therefore sought to discover what part the processing of the emotions in childbirth played.

The previous chapter described research published to date which used the EPS as a tool to measure the emotional processing of groups of patients in the general population, with conditions including colorectal cancer, fibromyalgia and rheumatoid arthritis (Lothian 2002; Raleigh 2004). Evidence showed that many patient groups with impaired emotional processing also had higher levels of anxiety and/or depression(Baker et al. 2007b). However what is not yet evident, because of the cross-sectional nature of the research, is whether there was a causal association with anxiety and/or depression as a result of impaired processing of emotions or conversely if anxiety and/or depression result in a deficit in processing.

Based on the findings of previous EPS studies it was hypothesised that pregnant women who had difficulty processing their emotions may suffer a higher rate of perinatal mental health disorders. Whilst it was not feasible to measure emotional processing and levels of depression prior to conception, it was anticipated that a measurement taken early in pregnancy, before its effects had the opportunity to impact greatly, could produce similar results. Thus a study measuring the emotional processing of a cohort of pregnant women at the beginning of pregnancy would facilitate exploration of the role that emotional processing has in affecting the experience of a major life event (pregnancy and birth) and the development of postnatal depression. The order of occurrence of poor emotional processing, a stressful life event (pregnancy and childbirth) and the development of a condition which adversely affects wellbeing (postnatal depression) would then become more explicit.

The aims of this study were therefore as follows:

1. To explore emerging patterns of emotional processing during pregnancy and in the postnatal period.

As the way pregnant women manage and process their emotions had never previously been explored, an understanding of any patterns or changes would

prove valuable to the understanding of women's psychological adjustment during pregnancy and the postpartum period.

2. To determine patterns of depression experienced by women during the antenatal and postnatal periods.

This information would facilitate comparisons with earlier studies and enable an exploration of relationships between emotional processing and maternal depression over the childbirth continuum.

3. To examine the relationship between the way women manage their emotions during pregnancy, as measured on the Emotional Processing Scale [EPS] (Baker et al. 2007b) and the development of postnatal depression, as measured on the Edinburgh Postnatal Depression Scale [EPDS] (Cox et al. 1987), and to explore any relationship in conjunction with other identified risk factors for postnatal depression.

It was anticipated that women identified as having impaired emotional processing at the beginning of their pregnancy would score more highly on the EPDS at six weeks postpartum, indicating that they were at greater risk of developing postnatal depression. In order to determine the potential relevance of impaired processing to the development of postnatal depression, emotional processing scores would also be considered in conjunction with other risk factors identified from earlier studies (O'Hara and Swain 1996; Beck 2001; Robertson et al. 2004).

4. To investigate whether, in conjunction with other recognised risk factors, it was possible to predict postnatal depression (as identified by high scores on the EPDS measured postnatally) from high scores on the EPS.

As described in Chapter 1, several attempts have been made to develop a predictive tool to assist with the identification of women at risk of developing

postnatal depression (Cooper et al. 1996; Stamp et al. 1996; Nielsen Forman et al. 2000). Their results, however, are inconsistent (Austin and Lumley 2003) and the possibility of identifying a risk factor, as yet largely unconsidered, which could be measured and its predictive quality investigated, would add to the body of knowledge about perinatal mental health and assist practitioners to promote early identification and appropriate referral of women with mental illness. By building statistical models to include previously identified risk factors for postnatal depression alongside emotional processing it was hoped to determine which factors would best predict depression postpartum. It was anticipated that further statistical modelling would determine the odds of a woman developing postnatal depression given certain risk factors including poor emotional processing.

If high scores on the EPS indicating poor emotional processing did appear to predict high scores on the EPDS, a plan of care embracing specific psychological approaches to strengthen emotional processing might be developed to manage certain perinatal mental health disorders in the future.

4.2 Objectives of the study

To address these main aims, the specific objectives of the study were as follows:

1. To identify whether there were changes to the way women managed their emotions during pregnancy and childbirth, (as identified by scores on the EPS at 13 and 34 weeks gestation and 6 weeks postpartum) and to determine what pattern these changes took (aim 1).

2. To calculate the percentage of women with scores above and below the threshold of 13 on the EPDS at each of the three time points to determine any patterns emerging in the development of antenatal and postnatal depression (aim 2).

3. To determine any correlations between women's scores on the EPS at 13 weeks and 34 weeks gestation and their EPDS scores measured at six weeks postpartum. It was anticipated that there would be positive correlations between poor emotional processing and postnatal depression scores (aim 3).

4. To test associations between EPS scores at 13 weeks and 34 weeks gestation (dichotomized into high and low scores) and scores over the threshold of 13 on the EPDS measured at 6 weeks postpartum. This would identify whether high scores on the EPS, indicating poor emotional processing, did indeed predict high scores on the EPDS, indicating probable depression (aim 4).

5. To build a statistical model to determine which variables, as measured by scores collected on the EPS, Short Form -36 and the Rosenberg Self Esteem Scale, and by demographic data gathered at the three time points had most influence on EPDS scores (aim 3).

6. To build a statistical model, using scores from all of the measurement scales and other demographic data to determine which variables best predict high EPDS scores (13 and above) indicating the likelihood of postnatal depression and to discover the odds of a woman having postnatal depression at six weeks postpartum , given certain conditions (aim 4).

Summary

The chapter has discussed the specific aims of the study justifying the importance of an enquiry into emotional processing in childbirth to the understanding of perinatal mental health disorders. Individual objectives embraced within the main aims of the study have also been detailed.

5. METHODS

Introduction to chapter

This chapter describes the approaches used, discusses the importance of sample size and how this was calculated, the choice of research setting, the methods of recruitment and data collection. The chapter continues by considering the design strategy for the questionnaires and how they were developed. The methods of analysis are then described and the chapter concludes by exploring the ethical issues arising from undertaking a study of women's psychological issues and emotions and requirements necessary to obtain ethical approval.

5.1 Search strategy for the literature review

A main search for information took place at the onset of the study, although a considerable amount of literature had already been identified by the researcher as a result of previous research and an interest in the subject of perinatal mental wellbeing. An electronic search strategy was adopted, initially accessing databases via the ISI Web of Knowledge. Databases searched included Medical Literature Online (MEDLINE) and the Web of Science. University library catalogues were searched for texts of relevance and professional and government websites explored for professional guidance. Additional searches employing the university search engines included the Cumulative Index of Nursing and Allied Health Literature (CINAHL), Health Information Services (formally The National Library for Health [NLH]), Maternity and Infant Care (MIDIRS), PsycINFO, PubMed, ScienceDirect and The Cochrane Library.

Literature from three key areas was initially sought – perinatal mental health, emotional processing and screening. The initial searches concentrated on papers

published within the last ten years from the start of the search in 2006 (that is from 1996), but older articles and seminal papers were included if significant. The searches produced a wealth of literature. For example a search of 'postnatal depression' produced 5005 papers while 'postpartum depression' produced 9015. 'Screening tools for postnatal or postpartum depression' produced 12,973 references and 'emotional processing' 19,822. Appendix 1.1 provides full details of the initial searches undertaken. Initially the searches were quickly scanned to select any relevant papers that stood out. Subsequently Boolean logic terms (and, or, not), truncation and wildcards were used to refine the search and reduce the number of studies retrieved. As the emerging literature was read in depth the search was extended to embrace other areas of interest arising. Reference lists and bibliographies from papers of interest provided further literature of relevance. The search for information of relevance to the study continued throughout the research period (that is from January 2006 to January 2012).

The strategy used to search each electronic database is presented in Appendix 1.2 Key words were identified and entered into each electronic database search. The searches focused on articles written in English, although a very small number of papers translated from their original language were included because of their relevance to the subject.

5.2 Approach

A prospective longitudinal survey approach was selected as this was considered to be the most appropriate design to meet the study aims and objectives. Longitudinal research is defined as that in which data are collected for variables at two or more different time points for the same cases, and analysis involves comparison of the data between those time periods (Menard 2002). In prospective designs data are normally collected from a cohort of participants followed over time and time-related changes occurring to variables measured for

the cohort are identified (Menard 2002). A longitudinal approach also enables the researcher to describe patterns and directions of change (Menard 2002).

A survey is appropriate to collect information from a large number of people, enabling the researcher to gain an understanding of patterns of behaviour (Rees 2011). Often undertaken via a questionnaire, a survey is an economic way of gathering a wide, inclusive and diverse range of data (Denscombe 2004; Polit and Beck 2008).

A major problem with longitudinal cohort studies, where data are collected repeatedly from the same group of participants is people dropping out of the study (Rees 2011). This can result in a large amount of missing data and difficulty drawing clear conclusions. In reporting results from this current study care has been taken to identify the number of participants responding at each stage and those responding to all questionnaires to ensure that invalid comparisons between unequal groups are not made across time points. Provision has been made in the analyses to account for missing data and this is explained in detail when the results have been reported.

A further problem relating to the use of surveys and the associated attrition is the representativeness of the final sample, which is important in order to generalise the findings to a larger population (Rees 2011). In this current study selection criteria excluded very few women (see 5.3.2) and results presented in Part 3 demonstrate the representativeness of the sample.

The validity of surveys is a further issue which can cause difficulty as there is no certainty whether the response given by the participant is true or whether a more social acceptable response has been given to please the researcher (Rees 2011). In the current study the questionnaire survey contained four measurement tools which had been validated for use with pregnant or postpartum women or women of childbearing age thus strengthening the validity of the responses.

5.3 Sample

The sample size was determined by power calculations which took into consideration UK national figures for postnatal depression (Mc Farlane et al. 2002; Lee et al 2004) together with the standard deviation in EPS scores from previous studies where it was used with women of childbearing age (Lothian 2002; Baker et al. 2004; Raleigh 2004).

The primary hypothesis of the study was divided into the three following components:

- That there would be a significant difference in the mean EPS scores at thirteen weeks antenatally between women who did and did not subsequently develop postnatal depression (as determined by a score of 13 or over on the EPDS measured at 6 weeks postpartum).
- That there would be significant correlations between women's EPS scores at 13 weeks antenatally and their 6 week postpartum EPDS scores.
- Scores on the EPS would predict scores on the EPDS -a high cut-off score on the EPS predicting a score above the threshold of 13 on the EPDS postpartum.

The main sample size calculations were based around the first component of the primary hypothesis.

To estimate the sample size necessary to demonstrate statistically significant relationships if they existed, EPS data from previous studies undertaken by Dorset RDSU were used (Baker et al. 2007b; Baker et al. 2010). Data from four groups were selected. The first was a 'mental health group', comprising patients suffering from anxiety, depression or personality disorders, who were referred to a clinical psychologist by their GP. A second set, a 'GP group', comprised patients who completed the EPS questionnaire in the waiting room before attending their doctor's appointment. A third set, a 'pain group', contained patients attending a

pain clinic. The fourth set, the 'control group', included hospital staff, a selection of IT workers and travellers who had been approached to complete the questionnaire while on a train journey. From these groups, which contained both males and females, all females between the ages of 16 and 45 were selected as these were thought to represent characteristics similar to the intended participants for the current study and thus would provide an informative comparison. This gave data on 345 women. Table 5.1 identifies the mean EPS scores and standard deviations (SDs) for these groups.

Table 5.1. Sub group EPS scores

Group (Females 16 – 45)	Mean EPS	SD	N.
Mental health	**5.14**	**1.14**	**74**
GP	**3.89**	**1.49**	**29**
Pain	**3.66**	**1.59**	**93**
Control	**3.06**	**1.43**	**149**

As the SDs for the four groups ranged from 1.14 to 1.59, with the mean for the whole being 1.41 it was therefore decided to take an average SD of 1.4 for the power calculations for the current study.

The incidence of postnatal depression in the target population was assumed to be approximately 15%. This figure took into consideration national UK statistics of 12.3% (MacFarlane et al. 2002; Lee et al. 2004), statistics of 28% identified by SIGN (SIGN 2002) and the generally accepted postnatal depression prevalence of 13% found from meta-analyses (O'Hara and Swain 1996). Evidence of under-reporting of symptoms by women was also taken into consideration (Nielsen Forman et al. 2000; Yonkers et al. 2001). It was anticipated therefore that 85% of women in the proposed study would not develop postnatal depression and 15% would. The primary sample size was therefore based on a comparison of the mean EPS scores at thirteen weeks antenatally of participants who scored above the EPDS threshold of 13 at six weeks postnatally and those who did not. This

cut off point for the EPDS, which is discussed in greater detail in Chapter 6, was selected as it reflected that chosen in other postnatal studies, albeit not always at the same time point (Cox et al. 1987; Morrell et al. 2000; MacArthur et al. 2003; Dennis et al. 2004).

Table 5.1 illustrates that the greatest difference in mean EPS scores was between the control and the mental health groups (2.08). The EPS scores of participants in the studies undertaken by Dorset RDSU were measured at the same time as the participants experienced the illness or incident that defined their group/category. In this study, however, it was planned that EPS scores would be measured at 13 and 34 weeks antenatally and EPDS scores, identifying postnatal depression, at six weeks postnatally, with the potential that the difference in means might not be as large. A difference in mean EPS scores of 0.6 (which was the difference between the control and the pain group) was thought to be more reasonable to expect in the current study.

Table 5.2 shows the sample sizes necessary for detecting a range of effect sizes at the two-sided 5% level of significance, between the two groups of women scoring above and below the threshold of 13 on the EPDS. It assumed a SD of 1.4 and was calculated to provide 90% power.

Table 5.2. Required sample size

Difference in mean EPS scores	Necessary sample size	PND (15%) + control (85%)
0.2	4048	606 + 3442
0.4	1014	152 + 862
0.6	452	68 + 384
0.8	256	39 + 217
1.0	165	25 + 140
1.2	116	18 + 98
1.4	85	13 + 72

The table shows, for example, that 4048 participants would be needed for the study to have a 90% power to detect a difference of 0.2 in mean EPS scores at thirteen weeks antenatally, between a group of women with scores above the EPDS threshold of 13 at six weeks postpartum and those without (control group), with a significance level of 5%.

Using the figures from Tables 1 and 2, assuming a mean difference in EPS scores of 0.6 between women scoring above and below the EPDS threshold for postnatal depression at six weeks postpartum as suggested above, and that 15% of women would develop postnatal depression, it was calculated that a sample of 452 women would provide 90% power to detect a difference 0.6 at the 5% level of significance, assuming a standard deviation of 1.4. This level of sample size would also provide 90% power to detect a (small) correlation of 0.15 or more between women's EPS scores at 13 weeks antenatally and their scores on the EPDS at six weeks postpartum.

To allow for a 20% loss to follow up, which reflected loss to follow up at between six weeks and four months postpartum reported in other maternal studies (Morrell et al. 2000; Evans et al. 2001; MacArthur et al. 2003; Patel et al. 2005) this would require 543 women to be recruited.

When data collection commenced it soon became evident that the calculation of an 80% response rate in the study overall was optimistic and did not account for the loss to follow up at each stage of the study (i.e. 34 weeks gestation and six weeks postnatal). A re-calculation was therefore made, taking into account both the original 80% calculation plus the ongoing response rates observed by the researcher. Considering a persistent response rate of approximately 80% to the first two questionnaires and an anticipated response rate of 76-80% to the third questionnaire it was concluded that 960 women would be an appropriate sample to recruit in order to achieve a sample of 452 who returned all three questionnaires.

A further consideration for the sample size was that planned analysis would involve multivariate modelling. It is essential when building regression models to ensure that the sample size is large enough to take into consideration the number of predictor variables to be entered into the models. Given that the sample size in this study could have potentially included 68 women who scored above the EPDS threshold (see Table 2), using the 'rule of thumb' in multivariate modelling that 10 women with pre-determined poor outcomes would be needed for each predictor variable, it was considered reasonable to investigate seven predictive variables. Guidance varies concerning the number of cases required for the number of variables to be explored (Tabachnick and Fidell 2001; Stevens 2009). Tabachnick and Fidell (2001) provide a formula which states that the sample should be greater than eight times the number of variables plus 50. In this instance the formula would equate to a sample size of greater than 106 to be able to generalise findings of multivariate modelling using seven predictors.

The third component of the primary hypothesis was that there would be associations between EPS scores at thirteen weeks and thirty four weeks antenatally (dichotomized into high and low scores) and the development of postnatal depression, as identified by an EPDS score of 13 or more measured at six weeks postpartum, enabling a prediction of postnatal depression to be made. To determine whether a sample size of 452 women would provide a statistically significant association, EPS scores were divided into 'high' and 'low' scores. Assuming that 50% of EPS scores were high and 50% low, using a two-sided test, the study would have 80% power at a 5% level of significance, to detect a two-fold increase in postnatal depression between the groups, if it existed, (10% of the 'low' group and 20% of the 'high' group, with an average of 15%). If 85% of the group were defined to have a 'low' EPS score and 15% a 'high' score (as assumed for the EPDS) the study would have 90% power to detect a 2.5 fold increase in postnatal depression (32% of the 'high' group and 13% of the 'low' group).

5.4 Recruitment

5.4.1 Research setting

Recruitment took place within the South Central Strategic Health Authority area, with women initially booking to give birth under the care of one NHS Trust in the South of England being approached to take part. This area covered by the Trust was chosen as a well-established pattern of nuchal translucency screening would allow the researcher to access women at 13 weeks gestation, considered pragmatically to be the earliest point in pregnancy that all women could be identified as eligible to be included.

5.4.2 Method of recruitment

Recruitment took place over a period of 14 months, from November 2007 to January 2009. All women attending their routine nuchal translucency ultrasound scan in the antenatal clinic at 13 weeks gestation were invited to participate. As the uptake for this scan was 98%, approaching women at this time was considered the optimal method of accessing the widest number of participants in early pregnancy.

During the 14-month period, a letter of invitation to participate plus an information sheet describing the study were sent out with appointments for the routine antenatal nuchal screening to all women aged over 16 years (Appendix 2.1, 2.2). The letter explained that when they attended the antenatal clinic they could seek further clarification about the study from the researcher, who would invite them to complete a consent form giving their agreement to participate if they wished. A copy of the consent form was also sent in advance for women to peruse (Appendix 2.3).

When the women reported to clerical staff to confirm their arrival at antenatal clinic, those requiring further information or wishing to participate in the study were asked to speak with the researcher who was positioned in a secluded area

of the clinic. Although the original intention had been to approach only English speaking women, because of the practical and financial implications of accessing an interpreter, it emerged that a number of those who were unable to speak fluent English were able to understand the written word quite well and if this was the case they were included in the study if they requested it.

When the researcher was unable to attend the clinic personally, a research assistant undertook recruitment. As the study became established other staff became involved, and if neither of the researchers was available, staff manning the appointment desk gave women a card to complete so that the researcher could contact them at a later date (Appendix 2.4). This adaptation arose from requests from women who had received the information sheet approaching the desk and asking to take part in the study. As it seemed unfair to exclude these women simply because the researcher was absent the contact card system was developed. These cards were only given to women who expressed an interest in the study. Staff did not approach the women.

5.4.3 Recruitment documentation

The recruitment pack sent to women included an information sheet, a copy of the consent form and a covering letter. The letter, on Trust headed paper (Appendix 2.1), invited women to participate in the study and directed them to the enclosed information sheet for further details. The introductory letter is an essential element of the recruitment process as it what initially attracts a person to the study (Douglas et al. 2005).

The information sheet was divided into two parts (Appendix 2.2). Part 1 sought to motivate women to participate by explaining the aims of the study and the relevance of the research to the future care of childbearing women. It also made clear to the woman what their participation would entail. Part 2 assured women that their anonymity and confidentiality would be protected and provided details of who to contact if there were any issues of concern. Information on postnatal support available locally and nationally, such as local peer support groups and

online websites including the Postnatal Illness (PNI) organisation was also included. The consent form contained tick boxes against statements that the women agreed with in giving their consent (Appendix 2.3). One copy of the consent form was retained by the woman and the other filed alphabetically and stored securely by the researcher. The researcher's copy was annotated with the participant's study identification number to enable the researcher to locate the woman from her register when birth notifications were sent out.

It was important during the course of the study that participants were identifiable so that the researcher could receive information pertaining to subsequent pregnancy loss or neonatal death after recruitment. An easily recognisable logo was therefore designed and this appeared at the top of the information sheets, consent forms, contact cards and all other associated documentation and communication with professionals in relation to the study (Appendix 2.5). The acronym EPIC (Emotional Processing in Childbirth) was also developed to make discussion of the study simpler and avert any possible embarrassment women may have felt from participating in a study associated with emotions and feelings.

When women agreed to take part in the study their names, addresses and telephone numbers were entered in registers where information was kept on the date that the second and third questionnaires were posted, receipt of completed questionnaires and the dates that reminders were sent and any other information of note. As their details were entered into the register women received a sequential identification (ID) number. The registers were kept by the researcher in a locked drawer.

A sticker depicting the EPIC logo was attached to the front of all participants' maternity notes to alert professionals to a woman's participation in the study (Appendix 2.5). Thus the researcher was quickly informed of any women undergoing terminations or suffering fetal loss subsequent to recruitment. These women were immediately removed from the study, thus avoiding causing any further distress at a time of great emotional upheaval.

To aid communication and ensure that all appropriate professionals involved with the care of women who agreed to participate were aware of the study letters of information were sent to all community midwives in the trust and to all General Practitioner (GP) practices.

5.5 Data collection

5.5.1 Process of data collection

Data collection took place by way of questionnaires distributed to women at 13 and 34 weeks antepartum and 6 weeks postpartum. Questionnaires are a convenient and financially viable way of gathering data from a large population (Punch 2003) and respondents can complete them at a time suitable for them (Edwards et al. 2002; Brindle et al. 2005). Women were offered the first questionnaire at their nuchal translucency scanning appointment if they consented to participate in the study. When the study commenced the researcher asked for women to be directed to her desk at the study site after their scan had been completed. This was to avoid undue pressure on the women at a time that is recognised as being potentially anxious for them (Malladi and Friedman 2006; Reid et al. 2009). In reality, however, a large number of women enquired about the study as soon as they arrived in the clinic and many were happy to discuss it and complete the questionnaire while waiting for their appointment. This was a positive outcome of data collection as response rates can be greatly improved by offering participants the opportunity to complete them at the time of distribution (Brindle et al. 2005). Recognising the potential for invoking further anxiety at this first antenatal appointment, however, women were provided with the choice of completing the questionnaire at clinic or taking it home and returning it later in a stamped addressed envelope provided. Chapter 7 details the response rates of each approach.

Women returning Questionnaire 1 (Q1) were sent a second similar questionnaire (Q2) by post at 34 weeks antenatally together with a stamped addressed envelope for return. Postage stamps were used rather than business mail as they are thought to increase the response rate of surveys because respondents do not want to see waste if they see that a stamp has already been paid for and physically attached to the envelope (Moser and Kalton 1971). A systematic review of 292 randomised controlled trials (RCT), including 258,315 participants, designed to find methods of influencing responses s to postal questionnaires, found that the odds of a questionnaire being returned were increased when a stamped addressed envelope was used (odds ratio 1.26, 95% confidence interval 1.13 to 1.41) (Edwards et al. 2002). The review also found that the use of a first class stamp increased the odds of return further, but unfortunately the costs were too prohibitive for this current study.

At six weeks postpartum, the period identified by Cox et al. (1987) as the peak time for the development of postnatal depression, participants were sent a third postal questionnaire (Q3) and pre-paid return envelope. The researcher was able to calculate the correct time to send out these questionnaires from weekly birth information received from clerical staff. In addition to this there was also a feedback system established with the Child Health Records Department. This ensured that the researcher was alerted to any neonatal deaths up to six weeks postpartum.

5.5.2 Design of the questionnaires

The layout of a questionnaire is important in determining whether people will be interested enough to complete it (Boynton and Greenhalgh 2004). It is essential that the design of any survey appeals and maintains the interest of those agreeing to take part (Rees 2003). The systematic review of RCTs of methods to influence responses to postal questionnaires mentioned earlier found that the use of coloured ink as opposed to black or blue ink increased responses (Edwards et al. 2002). Rather than use coloured ink in this study coloured paper was used

instead with the first questionnaire coloured green, the second blue and the third yellow. It was felt that this made them more interesting in appearance and also made each stage more easily identifiable. Initially they were produced in A4 size, but it soon became apparent that this was not an easily manageable size from the point of view both of postage and storage. So shortly after the study commenced the size was reduced to A5 which was much more manageable and looked more appealing. Care was taken to ensure that the reduction in size did not compromise the appearance or layout of the questionnaires. The questionnaires all bore the EPIC logo on the front. There was also a space in which the researcher completed the participant's identification number prior to the questionnaires being distributed.

The format of the questionnaire used at each follow up point was very similar. At each time point the questionnaires included the four validated measurement tools which gathered data on relevant variables found in other studies to contribute to postnatal depression. These tools, the Emotional Processing Scale (EPS), the Edinburgh Postnatal Depression Scale (EPDS), the Short Form 36 (SF-36) and the Rosenberg Self-Esteem Scale (RSE) are discussed in detail in the following chapter. Q1 sought demographic information from the respondent relating to age, occupation, parity, marital status and ethnicity. It also asked for details of past and current psychiatric history, family mental health history and current medical history (Appendix 3.1). Q2 sought information about health during pregnancy and any treatment received from the GP or as a hospital in-patient (Appendix 3.2) and Q3 asked for information relating to the birth and subsequent care, feeding choices and postnatal health (Appendix 3.3). Questionnaires used at each time point asked women for details of practical and emotional support perceived from their partners, family and friends and sought information on life stresses experienced during the last year. All of the extra information sought related to identified risk factors for postnatal depression (O'Hara and Swain 1996;; Beck 2001; Robertson et al. 2004). At no stage were the women asked for details that would identify them individually.

The sheer size of a questionnaire can be a major deterrent to completion (Denscombe 2004). Every effort was made to keep the questionnaires as brief as possible, but the length of the measurement tools, which were considered essential to gather the relevant information, made this challenging. Other questions were limited to those absolutely essential to identify key issues. In total there were 23 questions in addition to the 81 measurement scale questions in Q1, 10 additional questions in Q2 and 16 additional questions in Q3.

The order of questions in a questionnaire is important, with the content and style of earlier questions influencing whether a person continues any further (Denscombe 2004). It is generally recommended that questions related to social circumstances are located towards the end of a questionnaire (Polgar and Thomas 2007), and this format was followed. It is also considered best to introduce the questionnaire with neutral questions, leading to more personal and sensitive ones towards the end (Douglas et al. 2005). The questionnaires began with the SF-36 because it was considered that this was the least threatening and asked the least personal questions of all the measurement tools. The EPS was next, followed by the EPDS which could arguably be considered to be most challenging to complete because women are being asked to divulge very personal facts about themselves, including thoughts of self-harm. The RSE concluded the measurement scale questions.

Questions took the form of closed and multi-choice questions and Likert-type scales. The advantage of closed questions is that they are simple to fill out and therefore more likely to be completed, although Douglas et al. (2005) argue that with multi-choice questions respondents are more likely to choose the neutral option or tick more than one option. Multi-choice questions within the measurement scales could not be altered but care was taken to ensure that questions relating to demographic and personal factors had clear options for choice. The Likert-type, or rating, scales explored the attitudes, feelings and beliefs of the participants. Arguably these can be problematic because

respondents tend to gravitate towards the middle answer on the scale, known as the error of central tendency (Bowling 2000).

Each questionnaire ended by thanking the women for their time and support. This was essential to ensure that participants feel their input is valued (Douglas et al. 2005; Davis 2007). Advice was included that the respondents should contact their midwife, GP or other relevant health professional if they had any concerns about their physical or emotional health.

5.5.3 Piloting of questionnaires

It is essential to pilot questionnaires or other data collection tools to identify any ambiguity with the content of questions asked, or difficulty experienced with completion to enable any necessary amendments and adjustments to be made (Hundley and van Teijlingen 2002; Davis 2007). Once Q1 was compiled comments were sought informally from six women. These women were identified through the researcher's personal contact with an antenatal support group and reflected the characteristics of the group of women who would ultimately form the sample (Hundley and van Teijlingen 2002). The women were asked to complete the questionnaire and comment on its length and the ease and acceptability of completion. Despite the number of questions the feedback was positive, with the women agreeing that it took a lot less time than they expected to complete (average time 5 to 10 minutes) and that it was relatively easy and non-threatening. Three of the six women commented on their frustration at being unable to further explain answers to questions on the emotional processing scale. This was fed back to the developers of the scale and an additional comments box was added to the end of the EPS section in the questionnaire.

5.5.4 Reminders

Reminders help to improve the response rate for questionnaires (Douglas et al. 2005). As returns were recorded in the register it was easy to identify non-responders, enabling the researcher to send reminders to the appropriate

people. Women who did not return the first questionnaire were reminded by post after two weeks had elapsed that their response had not been received, but if they failed to return the questionnaire after this reminder they were deemed to have left the study and this was annotated in the register (Appendix 3.4). All other women who returned the first questionnaire were deemed to be participants and were sent reminders if they failed to return subsequent questionnaires within two weeks of receipt (Appendix 3.5, 3.6). Those who returned Q1 but did not respond to Q2, despite a reminder, were still sent Q3, unless they had specified that they wished to withdraw.

Reminder letters were sent out two weeks after the original questionnaire was received to those women who had not responded. It was important not to allow too great a period of time to elapse as women's feelings and emotions and consequently their responses might change in that time. Consideration was given to sending a duplicate copy of the questionnaire with another stamped addressed envelope for return, but costs prohibited this action.

5.6 Data analysis

Data were entered into a database and analysed using SPSS version 16. The first stage of the analysis, data checking, involved producing frequency distributions for all data and enabled the researcher to check for accuracy and completeness. When using measurement scales it is important to ensure that they are reliable with the particular sample being measured (Pallant 2010). Cronbach's alpha co-efficient was used to determine the internal consistency of each scale at each time point, thus determining reliability (reported in Chapter 6).

Summary statistics were produced to describe characteristics of the sample. Associations between these categorical variables were tested using the chi square test for independence, which determines whether two categorical variables are related. Percentages and significance values (p) are presented.

The aims of the study were to examine the relationship between the way women manage their emotions during pregnancy and symptoms suggesting the development of depression postpartum, and to investigate whether postnatal depression can be predicted from scores on the EPS in conjunction with other recognised risk factors. Analysis of the objectives inherent in these aims was achieved in the following way:

- Changes to the way women managed their emotions during pregnancy and childbirth and the pattern these changes took were explored using Pearson's product moment correlation co-efficient which examines the strength and direction of relationships, and one-way repeated measures analysis of variance (ANOVA) which tests for differences in mean scores measured on the same scale over time. Statistics presented are the correlation co-efficient (r) for the former, and Wilks' Lambda, F-value and the effect size for the latter test. Further exploration using the independent samples t-test and one-way between groups ANOVA was undertaken to examine differences in EPS scores between different groups such as primiparous and multiparous women, those in partnerships or not and in the impact of age and socioeconomic status (SES). All of these statistical tests were also applied to the other measurement scales to determine associations, patterns and changes in psychological health, general wellbeing and self-esteem over time. Statistical significance was taken at the 5% level of significance throughout the study.

- Independent samples t-tests were performed to compare the mean antenatal emotional processing scores of women who subsequently had postnatal depression and those who did not. T-values and 95% confidence intervals are presented. Differences in mean EPS scores over time of those women scoring high and low on the EPDS postpartum were explored using repeated measures ANOVA.

- In order to determine which variables, had most influence on mean EPDS scores multiple regression models were built. Multiple regression enables the researcher to model scores on a single dependent continuous variable in terms of a group of independent or predictor variables. In this study the technique was used to determine which variables (EPS, SF-36, RSE etc) had the most influence on mean EPDS scores postpartum, after adjusting for the effects of the others. Beta coefficients, t values, significance and 95% confidence intervals are presented.

- In order to build a statistical model to determine which variables best predict the likelihood of postnatal depression and to estimate the odds ratios of a woman having postnatal depression at six weeks postpartum, given certain conditions, binary logistic regression was performed. Binary logistic regression is used with a dichotomous dependent variable and was used to identify those independent or predictor variables that were associated with postnatal depression after adjusting for the other variables. Statistics presented are odds ratios, 95% confidence interval and significance value.

When undertaking regression analysis it is important that the number of variables in the model is appropriate for the size of the sample. As mentioned earlier, a common method of calculating the correct number of variables is: N > 50 + 8m (where m = number of independent variables) (Tabachnick and Fidell 2001, p.117). In logistic regression the common rule of thumb is 10 events (which in this case would be postnatal depression) per independent variable. In all the regression analyses the number of variables contributing to the models met these criteria.

A common problem with large studies gathering psychometric data is that the majority of the general population tend to fall within one side rather than on either side of a normal curve (Salkind 2008). This was the case in this study,

where the sample was large and the distribution for each of the measurement scales was skewed. In statistics, the Central Limit Theorem, which lies at the heart of probability theory, suggests that as sample sizes increase, parametric statistical tests become more robust to departures from assumptions about the distribution of the data (Dudley 1999). Parametric testing was undertaken throughout, but as a precaution, where data were not normally distributed the non-parametric Mann-Whitney U test was undertaken to confirm the findings of the parametric independent samples t-test. The Mann-Whitney U test converts scores on the continuous variable to ranks across two groups and evaluates whether the ranks for the two groups differ significantly. As the scores are ranks, therefore, the actual distribution of scores does not matter (Field 2005). Spearman's Rank Order Correlation, which also calculates the strength of the relationship between two continuous variables (Field 2005), was the non-parametric alternative to Pearson's product-moment correlation coefficient used to confirm the findings when data were not normally distributed.

The approach to analysis of data emerging from the measurement scales was an issue to be considered. Each of the scales was a Likert-type or attitudes scale. Likert-type scales are commonly used in questionnaire research and provide responses which are classified as 'ordinal' data. This is because there is ordered ranking between the responses (Denscombe 2004). There is much disagreement between those researchers who believe that data from Likert-type scales can be treated as a continuous interval scale and thus have parametric statistical tests applied to them and purists who believe that although there may be an inherent order or sequence, assumptions cannot be made that the respondent felt that the difference between each of the responses was equidistant (for example between agree and strongly agree, and disagree and strongly disagree) (Jakobsson 2004). They contend that the parameters of mean and standard deviation cannot be applied to the descriptive data in ordinal scales and nonparametric analysis must be undertaken. Conversely those in favour of treating data from Likert scales as continuous interval data would argue that in many scales the wording of the responses implies symmetry around the central

point. Thus treating it as ordinal data would lose some of the information gathered, whilst assuming interval scaled data would allow more complex analysis to be undertaken (Mogey 1999). In this study the decision was taken to treat the scale data as interval data to allow the application of parametric statistical tests which are more powerful than the alternative non-parametric tests. However, caution was applied when drawing conclusions from the data and alternative nonparametric tests were also applied to confirm the findings.

Inevitably in a longitudinal study like this, there will be a proportion of women dropping out of data collection (by not completing and returning questionnaires) In addition to the standard repeated measures ANOVA approach to looking at changes in measures over time, supplementary analyses were conducted that tried to take into account missing data. To address the problem of data missing from subsequent unreturned questionnaires the linear mixed-effects models (mixed) procedure was undertaken. This method may be used in studies such as this where there are repeated measurements taken from a cohort of respondents. Its action is to extend repeated measures models in general linear modelling to allow an unequal number of repetitions (Singer and Willett 2003). This means that participants who have contributed data to part of the study do not have to be excluded from analysis involving all time points, but rather existing information can be included and assumptions made about missing data which is considered missing at random (Garson 2012).

5.7 Ethical issues

To undertake any form of social enquiry researchers must ensure that they protect their participants' rights and dignity, avoid harm and operate with integrity and honesty (Denscombe 2004). Research involving people who are users of the National Health Service must be approved by the Integrated Research Application System (IRAS). At the time of receiving approval for this study the system was governed by the National Research Ethics Service (NRES) via

the research ethics committee responsible for the area in which the study takes place. Approval by these committees ensured that researchers conformed to national ethical guidelines and standards thus ensuring participant safety, confidentiality and data protection (Rees 2011).

Ethical approval was gained from Southampton and South West Hampshire Research Ethics Committee B (now South Central -Southampton B), and given the reference number 07/H0504/88. Approval was also gained from the Clinical Governance Department of the NHS Trust Hospital, which ensured that no extra burden of work was placed on staff employed by the Trust within the department where recruitment was undertaken, and monitored the use of resources to ensure no extra costs were experienced by the Trust as a result of the study. Support was also gained from the Head of Midwifery and the Clinical Director for Obstetrics and Gynaecology for the Trust to recruit women under their care and to use the facilities of the antenatal clinic. The researcher held an honorary contract with the Trust which enabled her to recruit women on Trust premises.

In line with ethical requirements participants were offered full information about the study and made aware of their right to withdraw at any time without their care being compromised. The women's consent to participate was given in writing and they retained one copy for their own records. Participants were also assured of their privacy if completing the questionnaire in the antenatal clinic and that their personal details would be stored in accordance with the regulations of the Data Protection Act 1998. They were also informed of arrangements for potential compensation.

All personal data collected from women were held in a locked file in a separate location from completed questionnaires and analysis. Only the researcher had a key to the cabinet.

It was recognised that completion of the questionnaires might raise women's personal awareness of any emotional or psychological vulnerability. Guidance

from NICE on antenatal and postnatal mental health encourages professionals to ask such probing questions about women's psychological health (NICE 2007). Based on this it was the opinion of the researcher that as women would be asked about their mental health as part of normal midwifery care the study was in line with the philosophy and current guidance for the management of childbearing women. However, the information sheet and the questionnaires included advice that women should contact their midwife, health visitor or GP if they felt anxious about their health or feelings. A list of relevant national and local support groups and advice lines was also included in the information sheet. Information about the study was sent to GP practices and local midwives and health visitors to raise awareness should any issues arise. This action ensured that the researcher was using her professional guidance to manage potential risk, whilst at the same time respecting confidentiality required as a researcher (Ryan et al. 2011).

Completion of question 10 in the EPDS ('the thought of harming myself has occurred to me') raised a number of ethical issues in relation to confidentiality and duty of care. A literature review by Lindahl et al. (2005) found that between 5% and 14% of women had thoughts of self-harm at some point during their pregnancy or the postpartum period. It was the opinion of the researcher that should a positive answer to this question be identified then her clinical and professional judgment must be applied and if the response was identified contemporaneously, while the woman was in antenatal clinic, then she should be referred to the clinic manager who would support her in the same way as any other vulnerable woman attending clinic (Ryan et al. 2011). Postal questionnaires included advice to the participants to contact their midwife, GP or other health professional if they had any concerns about their health. This is consistent with the advice given by the developers of the EPDS who suggest that although suicidal fears are a fairly common symptom of depression, a positive score on item 10 should be taken seriously and action taken to ensure that women have the appropriate advice and information regarding who they should speak to should symptoms arise (Cox and Holden 2003).

The possibility of creating emotional disturbance by sending questionnaires to women who had experienced a pregnancy loss was also recognised. To avoid this occurrence a feedback system was established with staff in the Early Pregnancy Loss Unit (which deals with miscarriages) and midwives in the Maternity Unit whereby the identifying logo on the front of the maternity notes enabled them to inform the researcher quickly of any participants experiencing a loss. A similar system was established with the Child Health Records Department to allow the researcher to be informed of any neonatal losses.

Summary

The chapter has described the research methods used in the study. It has justified the approach used, the tests for calculation of the sample size and the choice of setting for the study. It has explained the lengthy process of recruitment and data collection that the researcher undertook, rationalising methods adopted. The design and development of the questionnaires has been discussed and methods of analysis described. Finally the chapter explained the challenging ethical issues and considerations surrounding research into sensitive emotional and psychological experiences and how this would be addressed within the study.

6. MEASUREMENT TOOLS

Introduction to chapter

This chapter describes each of the measurement tools used in this study. The tools, each of which had been validated for use in a British population, included the EPS-25 (Baker et al. 2010), the EPDS (Cox et al. 1987), the Medical Outcomes Survey Short Form-36 , version 2 [SF-36] (Ware and Sherbourne 1992) and the Rosenberg Self-Esteem Scale [RSE] (Rosenberg 1989). Alternative tools that might have been suitable are also described to highlight why a positive decision was reached in favour of the scales selected. As the selection of the most appropriate instrument to use to measure outcomes of interest is key to the success of a study (Beck 1998), evidence of the reliability and validity of the instruments is also presented to show how the selected tools could be considered acceptable to produce results to potentially influence future practice (Beck 1998).

Where required, permissions were sought from the originators of the measurement scale prior to using them in this research study. As one of the research supervisors was involved with the development of the EPS (Baker et al. 2010), permission was granted by Professor Baker to use this scale. The Royal College of Psychiatrists who hold the copyright for the EPDS, allow it to be copied by individuals for use in research without seeking permission, provided it is copied in full and the developers acknowledged (Cox and Holden 2003). Explicit permission was not required in order to use the RSE in professional research, as long as the developer is credited in the research and the University of Maryland was informed of its use. All of the above conditions were met by the researcher. Following payment of a fee, a licence agreement was granted between QualityMetric Incorporated, the holders of the copyright of the SF-36 Health Survey and the researcher allowing the SF-36 to be used for the EPIC study only.

6.1 Measures of emotional processing

The aim of the study was to assess women's emotional processing using the EPS-25. The researcher was familiar with other work undertaken using this scale and as the introduction to this thesis explains, the current study arose from an interest in this particular measurement scale and the opportunities to use it with pregnant women. There were, however, other tools for measuring emotions or disturbances with emotions, which might have been considered. A brief overview of a selection is presented.

There are a number of measurement tools to assess alexithymia, which, as discussed in Chapter 3, is a term used to describe a personality trait in which people who have difficulty recognising, regulating and processing emotions (Haviland and Reise 1996; Taylor et al. 1997). Probably the most widely used tool is the Toronto Alexithymia Scale (TAS -20) (Bagby et al. 1994). This is a 20-item self-report scale which measures three dimensions of alexithymia, namely difficulty identifying feelings (DIF), difficulty describing feelings (DDF) and externally oriented thinking (EOT). Although a self-report scale, the authors recommend that the scores be evaluated alongside other contextual information derived from observer reports (for example from family and friends) and clinical observation (Taylor et al. 1997). This recommendation alone made the logistics of adopting it for use in this current study too onerous.

A further tool used to identify some of the factors involved with poor processing of emotions, namely difficulty identifying or describing feelings, and problems distinguishing bodily sensations from emotional arousal (aspects associated with a diagnosis of alexithymia) is the California Q-Set Alexithymia Prototype (CAQ-AP) (Haviland and Reise 1996). This tool uses observer methods of assessment and can be completed by lay or professional raters. One drawback, however, is that the procedure takes between 45 and 60 minutes to complete, and again this was considered to be too great a demand on time resources.

A briefer observer-based assessment tool which uses simple 'lay' language to assess characteristics of alexithymia (Haviland et al. 2000) was also examined. The 33-item Observer Alexithymia Scale (OAS) contains five factors (distant, uninsightful, somatising, humourless and rigid) and can be used by lay observers who know the patient well. The developers of the scale recommend that it be used in conjunction with other direct alexithymia measures such as the TAS-20 (Haviland et al. 2000), again making this quite a lengthy process to undertake.

A further tool which may have been considered was the Levels of Emotional Awareness Scale [LEAS] (Lane et al. 1990), which is a self-report measure created to provide a framework for understanding individual differences in the experience and expression of emotion. The scale, which contains 20 items takes approximately 30 minutes to complete and requires a trained rater to score it – again making its use in the current study prohibitive.

None of the measurement tools appeared has been used specifically with a pregnant population, and thus there was no guidance or comparisons available for the current study. Moreover, alexithymia measurement scales, although assessing similar constructs of emotional processing to the EPS, seemed inappropriate to use with a population of pregnant women who would be assumed in general to be well physically and psychologically. Alexithymia is a unique personality trait in which lack of imagination and insight, literal and rigid interpretation of events, and lack of humour all contribute to a deficit in processing emotions (Haviland and Reise 1996). To apply measures used to assess this psychiatric disorder could potentially create a situation in which unexpected psychological difficulties were revealed with no supportive structure in place to manage them.

6.2 The Emotional Processing Scale (EPS-25)

In contrast to the alexithymia scales the EPS was designed for people who are mentally and physically healthy in addition to patients with psychological and physical illness (Dorset Research and Development Support Unit 2003). It seemed therefore a more appropriate choice of measurement tool for a group of 'healthy' pregnant women.

6.2.1 Development of the Emotional Processing Scale

The EPS is a 25-item, self-report scale designed, and subsequently refined, to measure five facets of emotional processing (Baker et al. 2010). It was developed to help identify styles of emotional processing in normal healthy individuals as well as those suffering from physical or psychological disorders and to provide a research tool for those wishing to explore emotions within primary research (Baker et al. 2007a). As well as being validated for use in a British population (Baker et al. 2007a), subsequent work has validated the EPS translated into a number of other languages including Italian, French, Danish, Hindi and Japanese.

The scale, detailed in full in Appendix 4.1.1, encompasses the domains Rachman conceptualised as underpinning emotional processing (Rachman 2001) together with other psychological mechanisms thought to impede or disrupt successful management of emotions (Baker 2007). Originally a 53-item, eight factor scale designed to test a theory that patients suffering from panic had difficulty in processing their emotions effectively, it was later refined to 38 items with eight factors and was subsequently refined into its current form. The final shorter five factor, 25 item scale was considered by the developers to be more facilitative to use in both research and clinical practice (Baker et al. 2010).

The 25 items were developed and refined from a pool of the previous 38 items plus 15 items originating from 603 responses to questionnaires (Baker et al.

2010). The aim was to improve the factors relating to externalisation and avoidance of emotions which had lower internal reliability in the original scale and strengthen items relating to style and regulation of emotions which might indicate inadequate processing (Baker et al. 2010). Factor analysis ultimately resulted in 25 items and five factors or sub-scales.

Participants are asked to reflect on the previous week and circle a number on a Likert-type scale ranging from 0 to 9 indicating their consensus about each of the 25 questions. Responses range from completely disagree to completely agree. Total scores are produced for each group of five responses which make up a factor and the mean calculated. The total EPS score is calculated by adding the means for each subscale (factor) and dividing by 5 (Baker et al. 2007a). The scores can be compared with a table of norms which has been developed using percentiles for groups of healthy participants, a pain sample and a mental health sample (Appendix 4.1.3). Although responding to 25 items with 10 response options may seem time consuming feedback from women piloting the EPS-25 for the current study indicated that it was easy to complete in around 5 minutes.

Arguably, asking participants to reflect on the emotions they experienced in the last week may be limiting and it may be that a longer time span might provide a greater context and understanding of the emotions experienced. However, this time span is common in other validated measurement scales such as the EPDS and the SF-36 and will provide consistency in the current study.

A further consideration when viewing responses to the EPS is that the respondent is not required to give any context to the emotions felt, so interpretation of results could potentially be challenging without knowing the situation that gave rise to the emotion. There is, however, a section at the end of the questionnaire which allows the respondent to add any further information they consider important but it might not always be possible to relate any comments to specific items.

The developers of the scale state that its overall internal reliability is high (Cronbach's alpha = 0.92) and ranges from moderate to high for individual subscales (Baker et al. 2010). In this current study the Cronbach's alpha was 0.96 for the total scale at each time point.

6.2.2 The EPS sub-scales

The five factors, or sub-scales measured by the main scale are 'avoidance' which relates to a person evading negative emotional triggers, 'impoverished emotional experience', which captures aspects of alexithymia, or poor emotional insight, 'suppression' which describes excessive control of emotions, signs of unprocessed emotion', which relates to persistent or intrusive emotional phenomena, and 'unregulated emotion', which is an inability to control emotions, (Appendix 4.1.2). Each sub-scale contains five items (questions) and is able to evaluate emotional processing at specific phases in the process

Avoidance

The avoidance sub-scale acts on the input phase of emotional processing and relates to the way some people will try to avoid emotional situations. Appendix 4.1.2 presents the 'avoidance' sub-scale items. Foa and Kosak (1986) focused on this element of emotional processing when exploring memory structures that underlie emotions, suggesting how some people will go to lengths to avoid the fearful element of an experience, using distraction techniques or concentrating on non-feared elements, thus impeding the activation of fear. This technique they asserted is common in those suffering from anxiety disorders as avoidance helps to decrease their anxiety. Unfortunately it does not help sufferers to face the fear and restructure memory patterns (Foa and Kosak 1986).

Impoverished emotions

Poor scores on this sub-scale reflect a deficit in the 'experience' phase of emotional processing, whereby the person lacks awareness about their emotions leading to numbing or blunting (Baker 2007). Such a person may have problems recognising their emotions and labelling them and linking them to the causal

event (Baker 2007). People with this type of emotional deficit experience their emotions as physical sensations such as headache, back pain or stomach ache. 'Impoverished emotions' is related to the disorder of alexithymia, discussed in Chapter 3, where sufferers have difficulty not only identifying and describing their own emotions but also understanding the feelings of others (Taylor et al. 1997). Because they tend to have more physical symptoms, people with a deficit in the 'experience' phase of emotional processing have a greater susceptibility to other medical, psychiatric and psychosomatic disorders (Taylor et al. 1997).

Unprocessed emotions

Scores on this sub-scale identify deficits in the transition between the experience and the expression of the emotion. Baker relates this to the intrusiveness of the emotional experience which causes the person to continually ruminate on the emotional experience in their mind (Baker 2007). Rumination is essential to emotional processing, especially following a traumatic or stressful event when the memory needs to be registered in cognitive schema in order to help the person understand and resolve the issue (Baker 2007). For some people who are unable to stop thinking about the stressful experience, however, their thoughts become intrusive. Teasdale (1999), in his model of emotional processing discussed in Chapter 3, identified constant rumination of negative thoughts, which leads to a constant regeneration of implicational codes, as typical in depressive disorders.

Suppression

'Suppression' relates to the experience and expression of emotions where a person actively exerts excessive control by keeping their emotions hidden or directly blocking their expression. This behaviour may be seen in those with an addictive disorder, those with personality disorders or anxiety problems (Baker 2007). Although suppression can help a person manage an immediate emotional experience, long-term it can be very unhealthy as the emotion has not been processed effectively and may re-emerge at a later time to cause distress (Baker 2007).

A criticism of this sub-scale might be that it relates to two phases of the emotional processing cycle making it difficult to determine from the scores whether it is the experience or the expression of the emotion that is problematic. A cross- cultural comparison of emotional processing which used the EPS to assess emotional processing of participants in England, Italy and Japan, found that Japanese participants scored highly on the suppression sub-scale but it was difficult to determine whether they suppressed emotional experience or expression (Santonastaso 2010). The author suggested that this explained why the findings of the study, which showed that English participants suppressed their emotions more than Japanese participants, were in conflict with findings from earlier studies.

Unregulated emotions

This sub-scale relates to the expression of an emotion, high scores indicating an under-control of expression where a person may display excessive physical or verbal behaviour, and low scores suggesting over-control, where a person may appear unusually calm and relaxed in a situation that for most people would provoke some emotional expression (Baker 2007). Deficits in this sub-scale reflect the negative 'emotion regulation strategies' identified by Gross (2002) which can lead to an increase in emotional disturbance and wellbeing.

The sub-scales of the EPS provide the opportunity to explore deficits in each stage of emotional processing. It could be argued, however, that a number of the questions/items relating to each sub-scale may be open to misinterpretation by respondents from cultures other than English (Santonastaso 2010). For example 'I bottled up my emotions' is a typically English expression which may not translate easily into other languages or be easily understood by study participants form other cultures. The meaning of some items (for example 'It was hard to work out whether I felt ill or emotional', and 'sometimes I got strong feelings but I'm not sure whether they were emotions') may be unclear even to participants who speak fluent English. It may be that a person from a poor

educational background would have difficulty responding accurately to these questions. Moreover the requirement to think quite deeply about emotions experienced might be quite challenging to some people, in particular those of lower educational status and it may be that they would benefit from face- to-face questioning rather than self-reporting to enable them to seek clarification of items, and to similarly allow the person undertaking the measurement of emotions to identify difficulties and misinterpretations.

6.2.3 Cut-off points on the EPS

When a test is based on a continuous measurement a range of different cut-offs can be explored to determine which value should be used to discriminate between individuals with the condition (in this case poor emotional processing) and those without (Bewick et al. 2004). Work has been undertaken by the developers of the EPS scale to explore suitable thresholds to classify individuals with high and low EPS scores (Professor P. Thomas, personal communication, 26th August 2010 – see Appendix 4.1.4). Data collected from other studies involving the use of the EPS resulted in a database of 1014 healthy individuals and 211 people with mental health problems. The total mean EPS score for the mental health group was were approximately one point higher (4.64, SD 1.66) than the healthy group (3.66, SD 1.48).

Researchers involved with the development of the EPS-25 calculated a ROC (Receiver Operating Characteristic) curve, which plots sensitivity against specificity, to show the sensitivity (proportion of individuals in the mental health group with emotional processing problems as identified by high scores on the EPS) and specificity (proportion of healthy individuals who process emotions well, as identified by low scores on the EPS) (Professor P. Thomas, personal communication, 26th August 2010 – see Appendix 4.1.4) . The test determines whether it is possible to discriminate between two categories and thus distinguish what might be considered normal (scores below a cut-off point) and what might be considered abnormal (scores above the cut-off point) (Kinnear and Gray 2008). The position of the cut-off determines the number of true

positives and true negatives, and false positives and false negatives. In general sensitivity can be improved by moving the cut-off point higher and specificity can be improved by moving the cut-off point lower (Tape, 2010). Assuming that high sensitivity and specificity are equally important, the ROC analysis concluded that a cut-off point of 4.6 on the EPS is the best, although only marginally better than other values between 4 and 5 (Professor P. Thomas, personal communication, 26th August 2010 – see Appendix 4.1.4). This threshold of 4.6 gave a sensitivity of 57% and a specificity of 73%. This indicates that 57% of people with mental health problems were identified as having problems with emotional processing, while 73% of healthy people were identified as processing their emotions effectively. 27% of people in a healthy group might be expected to have high values. When no judgment can be made between the importance of high sensitivity and specificity, Youden's index (J) might be used to choose an appropriate cut-off. Youden's index is calculated by subtracting 100 from the sum of the sensitivity plus specificity – the higher the value, the better. In this case Youden's index was 30%.

A threshold of 4.6 was therefore adopted in this current study, with scores of 4.6 and over indicating poor emotional processing and scores of less than 4.6 indicating appropriate processing.

6.2.4 Use of the EPS with childbearing women

Emotions have always been closely connected with disease in the sense that diagnosis of acute, chronic and life threatening diseases have been thought to impact on the psychological wellbeing of patients (Baker 2007). What has been less widely accepted however is that deficits in managing emotions might well be a causal factor in the disease process. The study of emotional processing in childbirth seemed an appropriate context in which to explore the inter-relation between emotional processing and the development of psychological and physical disorders.

As discussed in Chapter 3 the EPS has been used in other studies to explore the emotional processing of patients with colorectal cancer, fibromyalgia, chronic back pain and anxiety disorders (Lothian 2002, Baker et al. 2004, Raleigh 2004). An exploration of cultural differences in emotional processing has also been undertaken (Santonastaso 2010). However, although these studies have included women of childbearing age, the EPS has not previously been used to assess the emotional health of pregnant women. Its use in the current study will be the first time it has been used with childbearing women. Although it has not been used by pregnant women, other studies involving participants with a range of physical and psychological conditions will provide comparable data on women of the same age group.

Prior to commencing the study the EPS was piloted, as discussed earlier, on a small group of six women in early pregnancy to determine the acceptability of the questions to them and determine whether any of the questions might have an ambiguous meaning when applied during pregnancy. However, unlike, for example, some questions on the SF-36 and EPDS, where negative responses to sleep- related or physical health questions might be invoked by the pregnant state of the woman rather than a psychological disturbance, the meaning of the EPS questions, relating entirely to feelings and emotions, did not appear to be interpreted differently as a result of changes in pregnancy.

6.3 Measures of Depression

A number of tools are available to measure depression in the general public, among them the Hamilton Rating Scale for Depression [HAMD] (Hamilton 1960), the Beck Depression Inventory II [BDI-II] (Beck et al. 1961), the Hospital Anxiety and Depression Scale [HADS] (Zigmond and Snaith 1983) and the Patient Health Questionnaire [PHQ-9] (Kroenke and Spitzer 2002). Some of these tools have been used by researchers to measure postnatal depression but over the last few decades a number of scales have been developed specifically to screen for

depressive symptoms during the perinatal period. Examples of these are the Postpartum Depression Screening Scale [PDSS] (Beck and Gable 2000), the Pregnancy Depression Scale [PDS] (Altshuler et al. 2008) and the Brisbane Postnatal Depression Index [PDI] (Webster et al. 2006). However, possibly the most familiar and one of the most widely used self-report tools for screening for perinatal depression is the Edinburgh Postnatal Depression Scale [EPDS] (Cox et al. 1987).

A number of these tools were considered by the researcher before being rejected in favour of the EPDS. In the UK, a comparison of the EPDS, the HADS and the HAMD was undertaken (Thompson et al. 1998). The HADS is a 14-item self-rating scale that identifies non-psychiatric conditions which could be considered suitable for postnatal women (Thompson et al. 1998). The HAMD is a 17-item observer-rated scale that measures behavioural and somatic features of depression (Hamilton 1960) and has been used in studies to measure depression both antenatally and postnatally (Ross et al. 2003b; Steinberg and Bellavance 1999). The EPDS is a 10-item self report scale, further details of which will be described in the following sections. In a comparison of the performance of the EPDS, the HADS and the HAMD in a group of 374 UK women originally participating in a study investigating the relationship between thyroid status and postnatal depression Thompson et al. (1998) found that as a screening tool for postnatal depression the EPDS performed better than the HADS, although the anxiety subscale of the HADS performed well. There was little difference, however, between the EPDS and the HAMD in terms of sensitivity and specificity, with the EPDS being more sensitive but less specific (Thompson et al. 1998).

The danger in using tools designed to measure depression in general is that the normal somatic symptoms of postpartum adjustment, such as fatigue, insomnia, changes in appetite and weight, may confuse accurate detection of depression (Beck and Gable 2001). An assessment of the use of the HAMD in perinatal settings, undertaken in Canada (Ross et al. 2003b) found that identification of antenatal depression was confounded by the somatic items on the HAMD,

specifically those asking about daily functioning, energy, insomnia and appetite, whereas at six weeks postpartum the somatic items did not appear to affect an identification of depression.

The BDI-II is a 21-item self-report screening instrument designed to detect psychiatric and non-psychiatric conditions. Commonly used internationally, it has been validated for use on an obstetric population (Beck et al. 1961) and used to determine depression in pregnancy (Holcomb et al. 1996; Jesse and Graham 2005). In a study of 147 postnatal women screened for major depression at six to eight weeks using the BDI-II and the EPDS, the BDI-II was found to have lower sensitivity and specificity (68% and 88% respectively) than the EPDS (95% and 93% respectively) (Harris et al. 1989). When the sensitivity, specificity and validity of BDI-II and the EPDS were tested on 185 pregnant Taiwanese women again the BDI-II was found to have lower specificity and sensitivity (74% and 83% respectively) than the EPDS (83% and 89% respectively) (Kuan-Pin et al. 2007). Reasons purported for the difference in validity are the high number of somatic items (such as sleeping disturbances, decreased energy, agitation, worthlessness and concentration difficulties) that the BDI has in comparison with the EPDS (Beck and Gable 2001). In populations with higher incidence of somatic complaints, therefore, the BDI could lead to false positives in detecting depression (Kuan-Pin et al. 2007).

A comparison of the EPDS, the BDI-II and the PDSS has been undertaken (Beck and Gable 2001). The PDSS, developed in the USA, is 35-item Likert response scale that measures seven dimensions each of which contains five items. The dimensions are sleeping and eating disturbances, anxiety and insecurity, emotional lability, cognitive impairment, loss of self, guilt and contemplating self harm and the items describe how a woman might feel after the birth of her baby. Women responded to the answer which best described how they felt during the previous two weeks. One hundred and fifty American women completed each of the measurement scales in random order and then participated in a structured interview using DSM-IV mood disorder diagnostic principles (American

Psychiatric Association 1994). The results showed that the PDSS had the highest combination of sensitivity and specificity when identifying major and minor depression (0.91 and 0.72 respectively) and correctly identified 94% of women with postnatal depression as opposed to 78% identified by the EPDS and 56% by the BDI-II. The authors of the PPDS argue that the larger number of items and the absence of negatively worded responses makes their measurement tool superior to the EPDS (Beck and Gable 2001).

The findings of this study were confirmed by White (2008), who replicated the methods above with 62 New Zealand women who found that the questions in the PDSS captured their feelings better than the other scales . The author recognised, however, that although the PDSS had superior sensitivity in comparison to the EPDS, the costs of obtaining a licence for its use might be prohibitive and concluded that professionals may still feel confident in using the EPDS which has good reliability and validity (White 2008).

In consideration of the above discussions the researcher chose to use the EPDS as the measurement tool for perinatal depression. Antenatal tools such as the PDS (Altshuler et al. 2008) were rejected because continuity of tool between antepartum and postpartum periods was preferred to allow for comparisons and identifications of changes occurring over time. Moreover use of the PDS has been limited to investigations of women who already had a diagnosis of clinical depression (Breedlove and Fryzelka 2011) and further testing of the tool is required. The HAMD was discarded not only because of the somatic dimensions that might confound the identification of perinatal depression but also because of the resources and time involved in using an observer-rated scale. The PDSS, as well as being costly to obtain a licence, was felt to be too long to include in a questionnaire that already contained lengthy measurement tools.

Although not recommended by the NSC in the UK for use alone in clinical practice to identify postnatal depression (Shakespeare 2005), the EPDS is considered suitable for research purposes and has been used in many studies

(Cox and Holden 2003). Examples of such studies are those measuring the effects of postnatal support at home (Morrell et al. 2000), assessing a redesigned programme of postnatal care on women's physical and psychological health (MacArthur et al. 2003) and exploring the effects of additional postnatal care on physical and psychological outcomes (Reid et al. 2002). The researcher felt that these studies, and others, would provide comparable data for this current study.

6.4 The Edinburgh Postnatal Depression Scale (EPDS)

The EPDS is a 10-item self-report scale designed and validated as a tool to screen for postnatal depression (Cox et al. 1987), which would allow clinicians to make a referral to a specialist for further tests to confirm diagnosis. It has also validated for use in the antenatal period, when it is sometimes referred to as the Edinburgh Depression Scale (EDS) (Murray and Cox 1990). It has been translated and validated for use in a wide range of countries across the world. The items of the scale can be found in Appendix 4.2

The scale was specifically developed for use with childbearing women and as such its design is one that is simple to use and, according to the developers, acceptable to women who do not regard themselves as unwell (Cox and Holden 2003). Although a small qualitative study of 39 postnatal women in the UK which explored the acceptability of screening using the EPDS found that just over half of the women were concerned about the intrusive nature of the questions (Shakespeare et al. 2003), a systematic review of screening tools for depression in pregnancy, that included the EPDS, agreed with the developers of the scale, finding that women were happy to be given the opportunity to respond to questions about their mental health (Breedlove and Fryzelka 2011).

The EPDS measures emotional and cognitive symptoms, and deliberately avoids somatic items which could be misleading as indicators of depression in a new

mother (Cox et al. 1987). The symptoms of depression assessed in the scale include an inability to laugh or to look forward to things with enjoyment, self blame, anxiety, panic, inability to cope, sleeping difficulties, sadness, crying and thoughts of self-harm. Although sleeping problems could be considered 'normal' in new mothers, within the context of the measurement tool they are linked with mood (Cox et al. 1987). There are four optional responses to each question which are scored from 0 to 3 and totalled to produce a final score, with possible results ranging from 0 to 30.

In the original validation study the Cronbach's alpha, which demonstrates the internal reliability of the study, was 0.87. In this current study the Cronbach's alpha was 0.88 at each stage.

6.4.1 Cut-off points and the sensitivity and specificity of the EPDS

The choice of cut-off points for screening instruments depends on the value attached to a tool's sensitivity and specificity and the importance of not missing those with the screened condition (Beck and Gable 2001). EPDS thresholds to detect probable depression vary from culture to culture and different thresholds have been recommended in specific populations to improve sensitivity and specificity (Eberhard-Gran et al. 2001). An American review of eight postnatal screening instruments showed that the EPDS demonstrated moderate to good reliability properties across samples taken from diverse countries and languages (Boyd et al. 2005).

Cox et al. (1987) found that a cut-off point of 12/13 identified all of the 21 out of 84 postnatal women in the EPDS validation study who had a Research Diagnostic Criteria (RDC) diagnosis of definite major depressive illness. The threshold also identified two of the three women with probable major depressive illness. Four out of 11 women with definite minor depression were false negatives (that is they scored 12 or below). The sensitivity was 86%, specificity was 78% and the positive predictive value was 73%. However the developers of the scale found that the number of true cases of depression missed could be reduced to below

10% if the cut-off were reduced to 9/10. They hasten to add that when using the EPDS in primary care as a component of a screening programme the 9/10 cut-off may be over-inclusive; a cut-off of 12/13 is recommended in this case (Cox and Holden 2003).

Several international studies have found that a threshold of 13 correctly identifies those women who are most seriously depressed (Cox et al. 1993; Tammentie et al. 2002). A review of a convenience sample of international studies using unvalidated EPDS cut-off points (Matthey et al. 2006) which investigated the impact of using unvalidated cut-offs without a rationale found that the optimum cut-off score to screen for major depression in postpartum English speaking women was consistently found to be 13 or more (or 12/13 as it is described in some texts, including Cox et al.(1987). The authors of the review recommend that there should be consistency in using this validated threshold in all studies, adding that the term '13 or more' should be used in preference to '12/13' to avoid confusion. The authors concede that there may be little actual difference in one point (12 as opposed to 13) in practice where screening using the EPDS would be supplemented by additional clinical measures. However when they compared the scores of 200 women from different studies using a cut off of both 12 and 13 they found a three-fold increase in the number of women identified as potentially depressed antenatally using a threshold of 12. Postpartum there was also a substantial increase. This could lead to a clinically significant difference in the interpretation of rates of perinatal distress and have enormous resource implications in practice (Matthey et al. 2006).

Based on the receiver operator characteristics recommended to achieve optimal sensitivity and specificity in the studies reviewed Matthey et al. (2006) agreed with the recommendations of Cox et al. (1987) that a depression score of 10 or more might be used to include minor depression. A review of eight self-report measures, including the EPDS, used to screen for postnatal depression (Boyd et al. 2005b) agreed with this recommendation.

The validity of the EPDS in detecting perinatal depression was assessed in a systematic review of 37 international studies (Gibson et al. 2009). The reviewers found a wide range of values for sensitivity and specificity at all cut-offs and a variety of cut-offs depending on culture and nationality. For example one study found that a higher cut-off value (14/15) was needed to accurately identify depression in Vietnamese speaking women in an Australian population than in English speaking women (9/10) (Barnett et al. 1999). The reviewers concluded that the accuracy of the EPDS varies depending on clinical setting, country and language of administration (Gibson et al. 2009).

For studies assessing depression in the antenatal period Murray and Cox (1990) recommend a different cut-off point to enable detection. The reason for this is that concerns of pregnant women, such as previous miscarriage, worries over the health of the fetus and fears about childbirth, may result in a transient heightened anxiety or stress. For this reason a higher threshold of 15 or more is recommended. Based on empirical evidence from studies using validated EPDS thresholds Matthey et al. (2006) agree with this recommendation.

A study validating the Taiwanese version of the EPDS identified different cut-off points when used antenatally, depending on the trimester of pregnancy (Kuan-Pin et al. 2007). The authors suggest that 12 to 13 is the optimal cut-off overall for the antenatal period with 13 to 14 being the most appropriate for the second trimester and 12 to 13 for the third trimester. They suggest that significant changes in physiological and psychological functioning such as hormonal and hypothalamic-pituitary-adrenal axis changes , leisure and work related physical activities, thyroid functioning and mood and anxiety levels all influence the development of depression at different stages of pregnancy (Kuan-Pin et al. 2007).

Consistent with the Taiwanese study (Kuan-Pin et al. 2007) Bunevicius et al. (2009), in a study of 230 Lithuanian women attending antenatal clinic screened antenatally with the EPDS, found that the prevalence of depression decreased

towards term indicating that a lower cut-off is necessary as pregnancy progresses. They found that the optimal cut-off in the first trimester was 12 or more (giving a sensitivity of 92%, a specificity of 95% and a PPV of 52%) , and in the second and third trimesters was 11 or more (with a sensitivity of 100% and 88% , a specificity of 92% and 92% and a PPV of 25% and 29% respectively).

Currently there is much discussion over the appropriateness of using the EPDS routinely during pregnancy as a tool to screen for depression. The UK NSC is currently reviewing its policy concerning screening for postnatal depression with a decision due in March 2012, but current guidance suggests that screening antenatally for risks of postnatal depression should not be undertaken as no known screening programmes meet the criteria of the NSC (NSC 2000). Consistent with this view, a qualitative study of women's experiences of completing the individual questions of the EPDS over the childbirth continuum (Godderis et al. 2009) reported that women's experiences during pregnancy were emotionally and physically very different from the postpartum period, raising concerns over the use of the EPDS on a pregnant rather than a postpartum population for which it was designed. The use of the tool with pregnant women for research purposes, however, is supported by the NSC (NSC 2000).

6.4.2 EPDS cut-offs in the EPIC study

In the current study the decision was taken to use the EPDS as a measure of depression both antenatally and postpartum in order to be able to determine any changes in women's scores over the childbirth continuum.

In view of the literature discussed above a cut-off of 13 or more to determine the likelihood of depression was selected as this was thought to represent a cautious estimate, identifying only those women who were truly depressed and enable comparison with other perinatal studies which used the same threshold (Evans et al. 2001; MacArthur et al. 2003; Matthey et al. 2006). As the focus of the study was to determine predictors of high postpartum EPDS scores it was not

necessary to identify a suitable threshold antepartum. However where antenatal high and low scores are considered a discussion of valid cut-offs is undertaken.

6.4.3 Anxiety component in the EPDS

The EPDS was developed as a unidimensional measure of depression (Cox et al. 1987). However subsequent studies, exploring the underlying factor structure have identified separate anxiety and depression dimensions within the scale in the antenatal and postnatal period (Pop et al. 1992; Green 1998; Brouwers et al. 2001; Chabrol and Teissedre 2004; Jomeen and Martin 2005a; Jomeen and Martin 2007), illustrating that the EPDS is a multidimensional instrument. There is, however, some discrepancy between these studies as some authors argue that the sub-scales of the EPDS may have a greater capacity to predict postnatal depression than a reliance on the total EPDS score (Jomeen and Martin 2005a) while others show that although a sub-scale of anxiety exists within the EPDS, anxiety is better assessed using the scale as a whole (Pop et al. 1992; Brouwers et al. 2001).

A study exploring the dimensions of the Dutch version of the EPDS distinguished a two-factor model containing sub-scales reflecting cognitive anxiety as well as depressive symptoms, plus an extra factor relating to the final question on self-harm (Pop et al. 1992). Despite this, however, the authors concluded that both anxiety and depression would be more accurately assessed using the EPDS in its entirety rather than attempting to distinguish subscales (Pop et al. 1992). Consistent with these findings, Brouwers et al (2001), in an exploratory factor analysis of the EPDS in a cohort of 197 pregnant women, identified an anxiety component in items 3, 4 and 5 on the EPDS scale (self blame, anxiety and panic). However they found that the anxiety sub-scale did not correlate any more highly with other established measures of anxiety, such as the State-Trait Anxiety Inventory (Spielberger et al. 1970), than the depression sub-scale. They therefore concluded that a three-item anxiety sub-scale was not sufficient to assess the complexities of anxiety and concluded that anxiety and depression

were more accurately measured when the EPDS was used as a whole and not broken into sub-scales (Pop et al. 1992).

Ross et al. (2003a) replicated the analysis of Brouwers et al. with a group of 150 Canadian women assessed for depression and anxiety in late pregnancy , and six and 16 weeks postpartum. They confirmed that the EPDS had an anxiety sub-scale containing three items as well as a depression component, concluding that the findings from pregnancy and postpartum provided evidence that the internal structure of the EPDS was consistent across the perinatal period.

Extending the above explorations of the dimensions of the EPDS Jomeen and Martin (2005a) undertook an exploratory and confirmatory factor analysis of the EPDS to determine whether there was a multidimensional measure of anxiety and depression in early pregnancy. Confirming earlier findings (Pop et al. 1992; Brouwers et al. 2001), exploratory factor analysis of the results from 101 women revealed a three-factor structure to the EPDS relating to anxiety, depression and the final self-harm question. Adding to the findings of the earlier studies, however, confirmatory factor analysis revealed distinct anxiety and depression dimensions, suggesting that the anxiety and depression sub-scales of the EPDS should be assessed separately (Jomeen and Martin 2005a).

An earlier study to determine the relationship between EPDS scores at 2-3 days and 4-6 weeks postpartum in a sample of 299 French women (Chabrol and Teissedre 2004) also identified a distinct anxiety factor separate from depression when the EPDS was used postnatally. Multiple regression analysis revealed that the 'anxiety' factor (as identified by items 3, 4 and 5) of the EPDS at 2-3 days was the only significant predictor of depression at 4-6-weeks. The authors concluded that the anxiety factors of postpartum blues were important in identifying women vulnerable to postnatal depression.

A further study by Jomeen and Martin (2007) undertaken to confirm multidimensional aspects of the EPDS in late pregnancy found that whilst

confirming three components to the EPDS, there was an instability in the factors contributing to depression over time. This resulted in a reduction of the validity of the EPDS as there was no certainty that it was measuring the same underlying dimensions across time. Thus a woman could be identified by the EPDS as depressed at different times in pregnancy and postpartum, although the contributing factor could be different at each time. The concern of the authors therefore was that women could be identified as suffering from depression without further consideration of other factors contributing to their mental health status at that time (Jomeen and Martin 2007).

In view of the above evidence no attempt was made in this study to use the EPDS as anything other than a unidimensional model. It was felt that sub-scale analysis of the EPDS was not necessary for the purposes of the study. Moreover, further evaluation of the mental health status of the participants was made from information gathered from the mental health component score of the SF-36.

6.5 Measures of general health

It was hypothesised that there would be a relationship between emotional processing and maternal health and wellbeing during the perinatal period. To measure the general health status of women in the study the Short Form 36 [SF-36] (Ware and Sherbourne 1992)and the General Health Questionnaire [GHQ] (Goldberg 1972) were considered.

The GHQ is a self administered questionnaire, designed to detect non-psychotic psychiatric cases in a general population (Goldberg 1972). Using a Likert-type scale the questionnaire asks respondents to identify how they have felt over the past few weeks, with questions designed to reveal two major areas – an ability to carry out normal functions and the appearance of new and distressing psychological phenomena. The questionnaire is available in a complete 60-item form, or shorter 30-item, 28-item or 12-item versions and assesses four

subscales of somatic symptoms, insomnia, social dysfunction and depression (Boyd et al. 2005).

The GHQ was initially considered for use in this study because the name suggested an evaluation of health in general, which was what was required, but also because it has been validated for use with antenatal women (Sharp 1988), postpartum women (Nott and Cutts 1982). A Chinese study designed to enhance positive predictive screening for postnatal depression used the GHQ in conjunction with the EPDS (Lee et al. 2000). The study found that simultaneous administration of the two scales improved the identification of postnatal depression. These results, therefore, together with closer inspection the questionnaire revealed the GHQ to have too great a focus on psychiatric disturbance for the requirements of this current study, with many of the questions similar to those found in the EPDS (for example feelings of panic and being overwhelmed by things). The psychiatric focus of the GHQ is confirmed by its use as a sole tool to identify postnatal depression (O'Hara and Swain 1996).

6.6 The Medical Outcomes Survey Short Form 36, version 2 (SF-36)

The SF-36 is a generic measure of general rather than extremes of health and wellbeing and was designed to detect positive and negative health states (Ware and Sherbourne 1992). Brazier et al. (1992), validating its use in primary care, reported that it was suitable for measuring the health of a population with relatively minor conditions, making it appropriate for a group of pregnant and postpartum women. The positive findings of a study designed to test the ability of the SF-36 to determine changes in health over time (Hemingway et al. 1997) demonstrated the appropriateness of its use in a longitudinal study.

The SF-36, developed in the United States to survey physical and mental health status, was designed to be used in both clinical practice and research (Ware and Sherbourne 1992). It is a relatively easy and quick to complete and contains 36

self-report questions each of which contains a variable number of boxes to be ticked. It assesses eight health concepts or domains: physical functioning, limitations in usual role activities because of physical health problems, limitations in usual role activities because of emotional problems, bodily pain, general health, vitality (energy and fatigue), social functioning and general mental health. There is one further question relating to current health in relation to general health over the past year. In total the scale measures three aspects of health: functional status, wellbeing and overall evaluation of health. Scores can range from 0 to 100, with 100 indicating optimum health. Two standardised summary scores can also be calculated – the physical component score (PCS) and the mental component score (MCS). Minor modifications have been agreed by the developers of the scale and made to the wording of six items on the original SF-36 to make it acceptable to a British population (Jenkinson et al. 1999). The UK version has been adopted for use in this study, and the first question relating to health in the past year modified to relate to health prior to pregnancy (Appendix 4.3). The developers report the internal reliability of the physical and mental component scores to be 0.95 and 0.93 respectively (Ware et al. 2000). The Cronbach's alpha in this study was 0.9 for each component at each time point.

The SF-36 has been validated for use in a UK population including in UK primary care settings (Brazier et al. 1992). Normative data for adults of working age, broken down by age and social class, have been generated (Jenkinson et al. 1993). Although it is recognised that it has not been validated specifically for use with childbearing women, a study exploring the psychometric properties of the SF-36 in early pregnancy (Jomeen and Martin 2005b) found that factor structure made it suitable for use with pregnant women. The use of the SF-36 both in antenatal work (Jomeen and Martin 2005b; Otchet et al. 1999) and postnatal studies (MacArthur et al. 2003; Morrell et al. 2000) provide data with which to make useful comparisons with outcomes of the current study.

6.7 Measures of self-esteem

Lack of self esteem was identified in three meta-analyses of over 100 studies as one of the antenatal factors most consistently associated with the development of postnatal depression (O'Hara and Swain 1996; Beck 2001; Robertson et al. 2004). As information regarding dimensions of self-esteem was not elicited from other parts of the questionnaire, it was necessary to find an appropriate self-esteem measure.

A search of databases to identify such measures consistently revealed the Rosenberg Self-Esteem Scale, making it an obvious choice for this current study (Rosenberg 1989). However one other measurement scale identified was the Coopersmith Self-Esteem Inventory (CSEI) which determines the relationship of academic achievement to personal satisfaction with adult life (Coopersmith 1959). The inventory consists of 50 items which the participant ticks as 'like me' or 'unlike me' and contains nine independent factors, five representing negative attitudes towards the self and four positive attitudes towards self . Studies using the CSEI however were predominantly of school age children and it was felt inappropriate to consider this measurement tool as no useful comparisons for data in the current study would be available.

6.8 The Rosenberg Self-Esteem Scale (RSE)

The RSE was designed to provide a unidimensional measure of global self-esteem (Rosenberg 1989). It has been extensively used in research and is an easy to administer, self report scale containing 10 statements to which participants indicate agreement on a four-point Likert scale (strongly agree, agree, disagree and strongly disagree) (Rosenberg 1989; Hall et al. 1996; Ethier et al. 2006) Total scores are computed and can range between 0 and 30, with higher scores indicating better levels of self-esteem. Appendix 4.4 presents the questions contained in the RSE.

The developer of the scale did not identify any discrete cut-off points. The internal reliability of the scale is reported as 0.85 to 0 .88 (Rosenberg 1965). In the current study the Cronbach's alpha was 0.9 at each time point.

The scale has proven reliability and validity (Blascovich and Tomaka 1991; Brazier et al. 1992) and has been used internationally in childbirth research (Klock and Greenfeld 2000; McVeigh and Smith 2000; Kamysheva et al. 2008; Gözüyilmaz and Baran 2010; Bödecs et al. 2011). A Brazilian cross-sectional study used the scale to assess the self-esteem of 127 women in the second trimester of pregnancy (Macola et al. 2010) and considered it easy to use and appropriate for the population.

The extensive use of the RSE in childbirth research, therefore, makes it a suitable choice of measurement tool for this study. The global perspective that it affords enables the researcher to gain a broader picture of participants' perceptions of themselves and their self-worth.

6.9 Additional measures

6.9.1 Stressful life events

As certain life events are known to be stressors that can impact on women's emotional wellbeing, participants were asked at both contact points in pregnancy (13 and 34 weeks), as the fifth part of the questionnaire following completion of the measurement scales, if they had experienced any stressful events. Determination of what might be considered stressful life events was undertaken by consulting the Holmes and Rahe Social Readjustment Rating Scale (Holmes and Rahe 1967). This scale, developed in the United States following the examination of 5,000 medical records for associations between stressful life events and illness, rates 43 life events in order from most to least stressful. The scale has been commonly used for many years in psychiatric medicine (Kendler

et al. 1999). It would not have been practical to include all 43 items in the study questionnaires, especially as many were not applicable to a group of pregnant women. Thus the five most major life stressors relevant to the sample population were chosen and adapted. Major injury and illness to self and to others (two independent questions) became major chronic illness to self or close family and changing job, being fired or made redundant were combined into undertaking a new job. Detention in jail was excluded as it was not considered relevant to the sample. The final five stressful life events identified included divorce, death of a loved one, house move, change of job and chronic illness in self or close relative.

6.9.2: Support from partner, family and friends

Low levels of support have been identified in several meta-analyses as a risk factor for postnatal depression (O'Hara and Swain 1996; Beck 2001; Robertson et al. 2004). In the current study levels of support were measured at each time point using a five-point Likert-type scale on which women identified whether they felt practically and emotionally supported by their partner, family and friends. The Likert-type scale was developed by the researcher to provide consistency of style with other scales included in the questionnaire. A score of one indicated 'as much I would like' and five indicated 'much less than I would like'. A score of three indicated neutral feelings. The questions differentiated between practical and emotional support as the literature suggests that social support, essential to wellbeing should involve emotional and instrumental elements (Will and Shinar 2000; Dennis and Ross 2006). The questions are detailed in the questionnaires in Appendix 3.

Summary

The chapter has discussed a range of validated assessment tools available to measure the various aspects of physical and psychological health and wellbeing required by this study. It has presented evidence of the reliability and validity of

the instruments and given reasons why positive decisions were made in favour of the selected tools. Further discussion has been around the formulation of further questions asked of the women in the study to elicit information about practical and psychological support and life stressors, each an important risk for postnatal depression.

The following section will present and discuss findings arising from responses to these measurement tools and questions.

PART THREE: RESULTS AND DISCUSSIONS

Introduction

Part three of the thesis presents the findings of statistical analysis undertaken. It presents demographic details and characteristics of the participants and explores the emotional processing, psychological health, physical and mental wellbeing and self-esteem of the women who took past in the study. Correlations between emotional processing and postnatal depression are examined, variables associated with postnatal depression are explored and models predicting postnatal depression are presented.

Part three concludes with analysis and discussion of the meaning of the results within the wider context of research knowledge and consideration of the implications of the findings for future clinical practice.

7. DESCRIPTION OF THE SAMPLE

Introduction to chapter

This chapter describes how women were approached and recruited to the study. It presents the response rates obtained from subsequent questionnaires, and also details information known about women who were recruited but did not respond to those subsequent questionnaires, identifying significant characteristics of non-responders. Demographic details of the participants are described together with their medical and psychological history, information about their pregnancy, birth events, infant feeding practices and their perceived levels of support.

7.1: Recruitment

Recruitment took place between November 2007 and February 2009. Women were recruited when they attended antenatal clinics (ANC) in the Trust for their first nuchal translucency scan at 13 weeks gestation. All women received an introductory letter and information leaflet with their appointment details. A total of 1,333 women who were approached either agreed to participate and accepted a questionnaire (Q1) or, when the researcher was unable to attend clinic, completed a card requesting a postal questionnaire. Nine hundred and seventy four women (73%) ultimately returned the completed questionnaire. Seven hundred and forty two of these women (76%) were recruited face to face and 232 (24%) via post. Three of these women only supplied responses to demographic questions on Q1 but completed all questions on subsequent questionnaires. 359 women did not return the first questionnaire. Table 7.1 identifies reasons for non-participation.

Table 7.1. Reasons for non-participation

Reason	Frequency
Miscarriage	11
Termination for abnormality	2
Moved house	2
Withdrew due to death in family	1
Returned without completing	1
Unknown	342
Total	359

Of the 342 women for which there is no information, 128 received postal questionnaires and therefore had no face-to-face contact with the researcher and 214 received the questionnaire in ANC but took it away to complete.

7.2: Response rates

Second and third questionnaires (Q2 and Q3) were sent by post to women at 34 weeks antepartum and 6 weeks postpartum. If necessary, women were sent two reminders. The first reminder was sent two weeks from the date that the original questionnaire was posted and the second reminder two weeks after that. Q2 was sent out at 34 weeks gestation to the 974 women who returned Q1. Seven hundred and thirteen women (73%) responded. Reasons for the non-return of 18 of the questionnaires were later identified as being miscarriage (n = 4), termination for abnormality (n = 1), pre-term birth before 34 weeks gestation (n = 3), moved house (n = 3), expecting twins (n =2) and did not wish to continue (n = 5). Discounting the women who could not respond therefore there was a 75% response rate.

Unforeseen difficulties arose with the distribution of Q3. A strategy had been established whereby the researcher received weekly birth notifications in order to identify the correct time to send Q3 to participants. Unfortunately, after

recruitment, and unknown to the researcher, a number of women changed their place of birth to nearby Trusts which were not part of the study, which meant that the researcher was not alerted when they had given birth. Consequently 35 women were not sent their third questionnaire. A further 37 women had returned Q2 uncompleted, indicating that they did not want to continue with their participation. A further five women were withdrawn from the study after completing Q2 because they had intrauterine deaths, one woman because of a stillbirth and a further two because of neonatal deaths. Therefore a total of 876 third questionnaires were distributed to the participants remaining. Responses were gained from 554 (63%) of these women. This was 57% of the original sample recruited. Eight questionnaires were returned uncompleted, the reasons for this including that women were no longer residing at the same address (4), their infant was ill (2), and women were too busy with their twins (2). In total 520 women (53%) returned all three questionnaires. Some women returned Q1 and Q2 only while others returned Q1 and Q3, but missed out Q2. Two women returned Q2 and Q3.

7.3: Characteristics of non-responders.

Characteristics of non-responders to the questionnaires were compared to responders to determine whether there were any differences. Subsequent to recruitment 233 out of 974 women failed to respond to Q2 and 322 out of 876 women failed to respond to Q3 (Figure 7.3). The chi square test for independence was used to explore the relationship between the characteristics of those women who did and did not subsequently respond the questionnaires.

The test showed that the percentage of primiparous women who responded to Q2 (73%) was not significantly different from the percentage of multiparous women who responded (72.3%) ($p = 0.69$).

Again there was no significant difference between the percentage of primiparous women who responded to Q3 (58%) and multiparous women who responded (55.7%) (p = 0.53).

There were, however significant differences in the ages of responders and non-responders (p = <0.001). Table 7.2 shows that only 3.8% of responses to Q2 came from the 19 and under age group, with the highest percentage coming from the 30 to 34 age group. Almost half of the 19 and under age group failed to return Q2. Within the age groups the highest response rate came from the 35 and over group with 81% of that group responding. There was no information about age for 9 respondents to Q2.

Table 7.2. Responses to Q2 by age group

Returned Q2		Age groups					
		≤19	20 to 24	25 to 29	30 to 34	≥35	Total
Yes	Number	27	70	188	228	191	704
	% within Q2s returned	3.8	9.9	26.7	32.4	27.1	100
	% within age group	55.1	59.8	72.3	75.0	81.3	73.0
No	Number	22	47	72	76	44	261
	% within Q2s returned	8.4	18.0	27.6	29.1	16.9	100
	% within age group	44.9	40.2	27.7	25.0	18.7	27.0

Table 7.3 illustrates that the same pattern was revealed with the number of responses to Q3, with only 2.9% of responses to Q3 coming from the under 20 age group and the highest percentage of responses coming from the 30 to 34 age group. Again, the highest response rate within the individual age groups came from the 35 and over group. There was no information about age for 7 women who responded to Q3.

Table 7.3. Responses to Q3 by age group

Returned Q3		Age groups ≤19	20 to 24	25 to 29	30 to 34	≥35	Total
Yes	Number	16	44	150	187	150	547
	% within Q3s returned	2.9	8.0	27.4	34.2	27.4	100
	% within age group	32.7	37.6	57.9	61.5	63.8	56.7
No	Number	33	73	109	117	85	417
	% within Q3s returned	7.9	17.5	26.1	28.1	20.4	100
	% within age group	67.3	62.4	42.1	38.5	36.2	43.3

Table 7.4. Responses to Q2 according to occupation

Returned Q2		Occupation Managerial/ professional	Intermediate occupations	Small employers	Lower supervisory /technical	Routine	Unemployed /unclassified	Total
Yes	Number	143	166	18	89	128	157	701
	% within Q2s returned	20.4	23.7	2.6	12.7	18.3	22.4	100
	% within occupation	83.6	75.8	81.8	68.5	67.0	69.8	73.2
No	Number	28	53	4	41	63	68	257
	% within Q2s returned	10.9	20.6	1.6	16.0	24.5	26.5	100
	% within occupation	16.4	24.2	18.2	31.5	33.0	30.2	26.8

Social economic status (SES) was also explored to determine any relationship between this and women's response to the questionnaires. Table 7.4 shows that the largest overall percentage of responses to Q2 came from those women employed in intermediate occupations such as secretaries and health care assistants (23.7%). Those who were unemployed or unclassified (such as students or housewives) followed close behind (22.4%). Within occupation

groups, however, the largest number of responses, however, came from the managerial and professional group with 83.6% of members responding. The group having the lowest response rate was that representing routine occupations, although 67% of their members returned their questionnaires. These results were significant (p = 0.003). There was no information regarding SES for 12 women responding to Q2.

Postnatally, 23.2% of all the responses to Q3 came from the intermediate occupation group. However, within the occupational groups the largest number of responses came from the managerial/professional occupations with 70.6% of the group responding. These results were significant (p <0.001). There was no information about SES for 10 women responding to Q3. Table 7.5 presents these results.

Table 7.5. Responses to Q3 according to occupation

		Occupation						
Returned Q3		Managerial/ professional	Intermediate occupations	Small employers	Lower supervisory /technical	Routine	Unemployed /unclassified	Total
Yes	Number	120	126	14	77	94	113	544
	% within Q3 returned	22.1	23.2	2.6	14.2	17.3	20.8	100
	% within occupation	70.6	57.5	63.6	59.2	49.2	50.2	56.8
No	Number	50	93	8	53	97	112	413
	% within Q3 returned	12.1	22.5	1.9	12.8	23.5	27.1	100
	% within occupation	29.4	42.5	36.4	40.8	50.8	49.8	43.2

The relationship between women's psychological conditions (as identified from their responses to questions about past and current disorders and treatment) and their responses to Q2 and Q3 was also explored. Analysis showed that there

was no significant relationship between a woman's current psychological condition and whether she responded to Q2 or to Q3 (p = 0.06 and 0.06). A past history of depression did not appear to make a difference to whether a women responded or did not respond to Q2 (p = 0.09), but it did make a significant difference to response to Q3, with only half of the women who admitted to having a history of depression responding (p = 0.02).

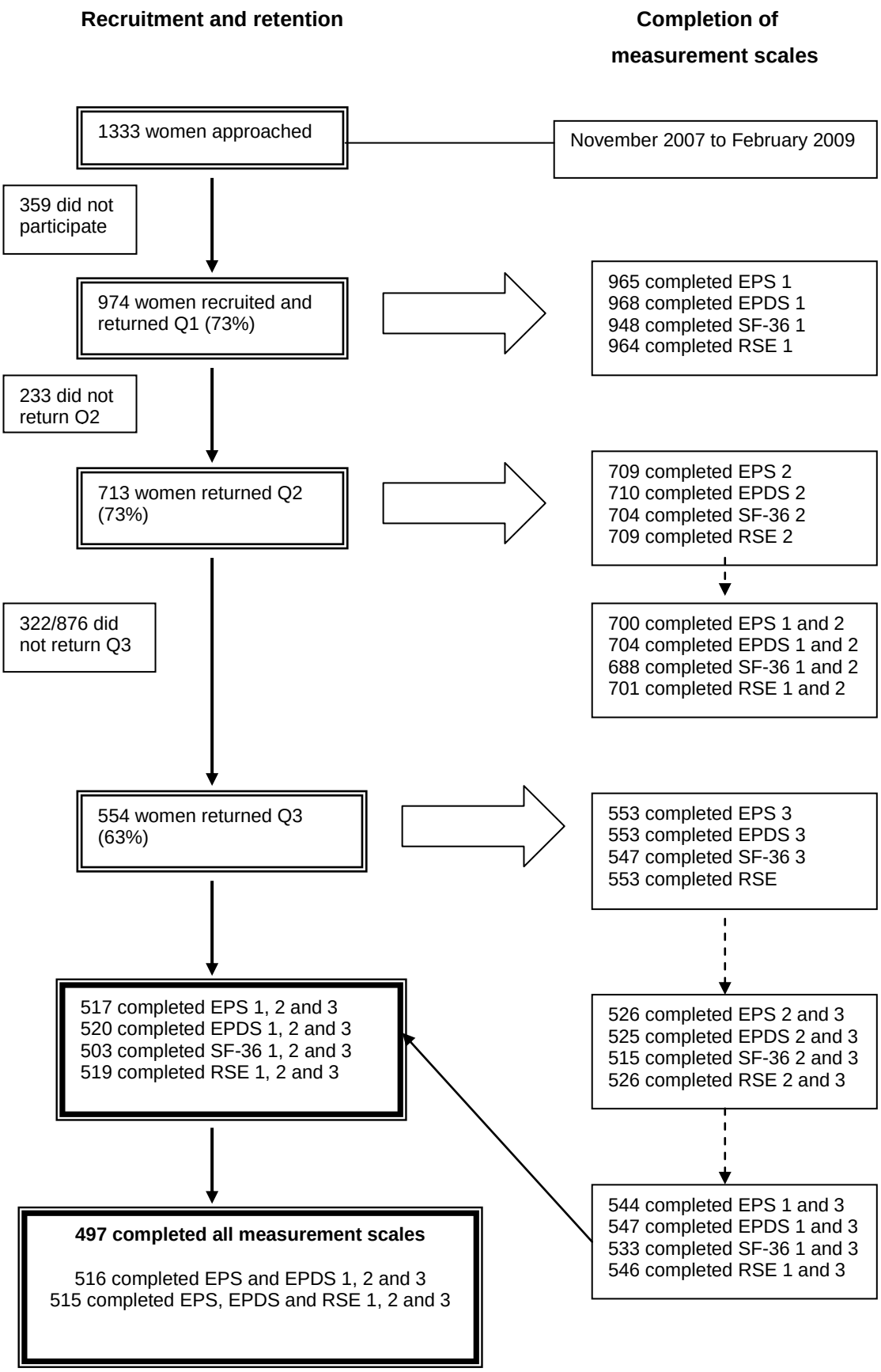
There was also a significant relationship between a past history of postnatal depression and whether or not women responded to Q2 and Q3 (p = 0.006 and <0.001). 12.4% of multiparous women who responded to Q2 (n=45) had suffered from postnatal depression in a previous pregnancy, and this was 59.2% of all women who admitted to having suffered from postnatal depression. Of the women responding to Q2, 87.6% (n= 319) did not have a history of depression postnatally. Eighteen of these women subsequently dropped out of the study and only 27 women responding to Q3 (9.6% of the total responses) had suffered from postnatal depression. This was 35.5% of all women who had suffered from postnatal depression previously.

7.4 Responses to measurement scales

A record of the completion of the four measurement scales included in the questionnaire was made in order to aid the analysis and interpretation of results. These measurement tools were the EPS, the EPDS, the SF-36 and the RSE.

Figure 3 presents details of the completion of measurement scales in relation to the numbers of women responding at each stage of the survey.

Figure 2. Responses to measurement scales at each time point



7.5: Characteristics of the study population

Descriptive analysis produced demographic details about the participants.

7.5.1: Social characteristics

Questions about key demographic characteristics which would help to describe the women participating were included in Q1. These characteristics are shown in Table 7.6. The majority of women were white British or European (93%), followed by Asian (3%), African-Caribbean (1%), Chinese (1%), mixed race (0.5%) and other (0.5%).

In order to determine the socio-economic status (SES) of the women, details of their occupation were sought. These data were coded according to the Standard Occupational Classification (SON) used by the Office of National Statistics. Most commonly women were employed in intermediate occupations such as secretary or healthcare assistant (23%) or were in non-classified occupations such as housewives and students (20.9%). Table 7.7 gives details of the occupations of all participants who responded to the question.

Table 7.6. Demographic details of participants identified from Q1

Variable		Number	Percentage
Parity	Primiparous	460	47.6
	Multiparous	506	52.3
	Total	966	100
	Missing	8	
Age	19 and under	49	5.1
	20-24	117	12.1
	25-29	260	26.9
	30-34	304	31.5
	35 and over	235	24.3
	Total	965	100
	Missing	9	
Partner	Has partner	947	98.0
	No partner	19	2.0
	Total	966	100
	Missing	8	
Relationship with partner (self-defined)	Good	937	99.5
	Not good	5	0.5
	Total	942	100
	Missing	32	
Living situation	Partner	876	90.7
	Alone	37	3.8
	Parents or relation	52	5.3
	Total	965	100
	Missing	8	
Experienced stressful life events in preceding 12 months	Divorce	23	2.3
	Death of a loved one	163	16.9
	Moved house	286	29.6
	New job	221	22.9
	Chronic illness	90	9.3
	Total	963	100
	Missing	11	

Table 7.7. Socioeconomic status of respondents to Q1

Occupation	Number	Percent
Higher managerial and professional (doctors, lawyers, dentists)	22	2.3
Lower managerial (teachers, nurses, journalists)	149	15.6
Intermediate occupations (health care assistants, secretaries,)	219	22.9
Small employers (hairdressers)	22	2.3
Lower supervisory and technical (supervisors, foreman)	130	13.5
Semi-routine (shop assistant, call centre workers, care assistants)	142	14.8
Routine (waitresses, cleaners, bus drivers)	49	5.1
Never worked, long term unemployed	21	2.2
Not classified (incl. students, housewives, insufficient information)	204	21.3
Total	958	100
Missing information	16	

7.5.2: Medical history of participants

Details of the medical and psychological history of women completing Q1 were also sought to provide a background for any conditions which might develop during the course of the study and to identify potential associations with the onset of new symptoms. One hundred and thirty four women (14%) reported ongoing medical conditions. Despite being asked to report all current conditions those responding to this question only identified one. It is not possible to know whether they only suffered from one complaint or whether they only reported the condition causing concern. Table 7.8 presents more detailed information of the main conditions identified.

Table 7.8. Medical history of participants completing Q1

Medical condition	Number of women	Percentage of sample
Asthma	35	3.6
Hypothyroidism	16	1.6
Hyperemesis	9	0.9
Diabetes	5	0.5
Back pain	5	0.5
Anaemia	4	0.4
Arthritis	4	0.4
Epilepsy	3	0.3
Other	53	5.4
Total	134	13.6

7.5.3: Psychological history of participants

Thirty six women (4%) were receiving treatment for a psychological condition when they completed Q1. Conditions reported were depression (n = 27), anxiety (n =3), obsessive compulsive disorder (n = 2), bipolar disorder (n = 1) and others unspecified (n = 3). Most conditions were being treated with antidepressants.

Seventy eight women (8%) reported a history of psychiatric treatment. Conditions ranged from depression (n = 49), anxiety (n = 9), eating disorder (n = 8), attempted suicide (n = 3) and unspecified (n = 9). Forty two of these women (53%) had been treated with antidepressants and 19 had attended counselling.

Three hundred and thirty eight (35%) of women reported a history of depression among close family members. Seventy six women (15%) reported a history of severe postnatal depression in previous pregnancies.

7.5.4: Participants' experiences of stressful life events

Participants were asked at both stages in pregnancy to identify whether they had experienced any of a list of five common life stressors identified – divorce, death

of a loved one, house move, change of job or chronic illness in self or close family. Q1 asked whether any of these stressors had been experienced within the last year and Q2 asked whether they had been experienced during pregnancy. Table 7.9 presents the responses.

Table 7.9. Life events experienced before and during early pregnancy

Stress		Divorce	Death of loved one	Moved house	New job	Chronic illness
		Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)
Q1 (last 12 months)	No	939 (97.6)	801 (83.1)	678 (70.3)	742 (77.1)	872 (90.6)
	Yes	23 (2.4)	163 (16.9)	286 (29.7)	221 (22.9)	91 (9.4)
	Total	962	964	964	963	963
	Missing	12	10	10	11	11
Q2 (during pregnancy)	No	700 (98.7)	637 (89.8)	603 (85.0)	669 (94.4)	645 (91.0)
	Yes	9 (1.3)	72 (10.2)	106 (15.0)	40 (5.6)	63 (8.9)
	Total	709	709	709	709	709
	Missing	4	4	4	4	4

The results show that the most frequently occurring life events in the 12 months leading up to pregnancy were moving house and changing job. Moving house was the most frequently occurring life event identified as occurring during pregnancy.

7.5.5: Pregnancy and birth events

Nine hundred and forty seven women responded to the question asked about fertility treatment. Forty six women (4.9%) had received fertility treatment to conceive their pregnancy.

Based on the data for the 713 women returning Q2, 12 women (2%) were expecting twins, while 698 (98%) were expecting one child. Responses to questions relating to medical treatment sought during pregnancy showed that 305 women (43%) had received treatment from their General Practitioner (GP)

the main reasons being for anaemia (18%, n = 56)), pelvic girdle pain (13%, n = 40)), urinary tract infection (8%, n = 23), thrush (7%, n = 20), back pain (4%, n = 13), heartburn (4%, n = 11) and hyperemesis (3%, n = 10). Ninety six women (13%) had been admitted to hospital, the main reasons being vaginal bleeding (21%, n = 20), dehydration (5%, n = 5), hypertension (5%, n = 5) and hyperemesis (3%, n = 3).

All of the women returning Q3 (n = 554) responded to the question asking about the type of birth they experienced. Based on data from these women, over half (64%) had a normal vaginal birth (Table 7.10).

Table 7.10. Type of birth experienced by participants

Type of birth	Number	Percent
Normal	356	64.3
Ventouse	39	7.0
Forceps	51	9.2
Elective C/S	34	6.1
Emergency C/S	74	13.4
Total	554	100.0
Missing because Q3 not sent or received	420	
Total	974	

Fifty seven percent of the women (n = 315) felt that they had the type of labour and birth they had planned (normal, homebirth or water birth) and 75% (n = 412) were happy with their birth experience. Of the 25% (n = 139) who were unhappy, the major reasons given by the women were obstetric complications and not having the birth that they planned. Poor care from professionals also appears to have affected the satisfaction with the birth experience, with a total of 26 women (19% of dissatisfied women) citing this. Table 7.11 shows the other reasons given.

Table 7.11. Reasons for dissatisfaction with birth

Reason	Number	Percent
Obstetric complications	30	21.6
Not the birth wanted	27	19.4
Inadequate pain relief	14	10.1
Emotional and distressing birth	14	10.1
Poor care from midwife	13	9.4
Poor care (non specific)	12	8.6
Long labour	9	6.5
Problems with fetus or baby	7	5.0
Made to feel a failure/let down	6	4.3
Lack of choice/control	5	3.6
Poor care from doctor	1	0.7
Differing opinions	1	0.7
Total	139	100

Women were asked if they experienced any physical health problems after the birth of their baby that caused them problems. They were asked to respond yes or no to whether they had experienced any of the health problems listed in the questionnaire. The particular health problems were selected because they were identified by MacArthur et al. (2002) as being commonly experienced after giving birth. The most commonly reported health problem was fatigue (48%), followed by back pain (38%) and perineal pain (34%) (Table 7.12). Psychological health problems are reported separately.

Table 7.12. Physical conditions affecting recovery after birth

Condition	Yes Number (%)	No Number (%)	Total Number (%)
Fatigue	266 (48)	288 (52)	554 (100)
Backache	211 (38)	343 (62)	554 (100)
Perineal pain, infection or bruising	186 (34)	368 (66)	554 (100)
Painful haemorrhoids	116 (21)	438 (79)	554 (100)
Difficulty passing urine	61 (11)	493 (89)	554 (100)
Pain or infection from caesarean section wound	54 (10)	500 (90)	554 (100)

7.5.6: Feeding practices

Information was gathered about how women fed their babies immediately after birth and at six weeks postpartum. Table 7.13 presents the responses to this question.

Table 7.13. Feeding practices of participants

Problems feeding baby		Feeding method at birth				Feeding method at 6 weeks postpartum			
		Breast	Formula	Mixed	Total	Breast	Formula	Mixed	Total
No	Number	217	73	3	293	173	111	9	293
	%	39.2%	13.2%	.5%	52.9%	31.2%	20.0%	1.6%	52.9%
Yes	Number	238	14	9	261	119	116	26	261
	%	43.0%	2.5%	1.6%	47.1%	21.5%	20.9%	4.7%	47.1%
Total*	Number	455	87	12	554	292	227	35	554
	%	82.1%	15.7%	2.2%	100.0%	52.7%	41.0%	6.3%	100.0%

*All percentages are out of 554 women responding to Q3

Data from the 554 women responding to Q3 showed that 261 women (47%) had experienced problems with infant feeding at some time in the first six weeks postpartum whether they breastfed or artificially fed. Among 455 women who

breastfed initially, 242 (53%) experienced problems. Nine out of 12 women who introduced mixed feeding from birth experienced problems and 14 out of 87 women who artificially fed from birth reported problems. Positioning and attachment to the breast were the most commonly reported difficulties (38%). Table 7.14 shows other difficulties reported by the women who breast fed. Women were asked to respond in their own words to the question asking about feeding problems faced. A number of problems, issues and explanations were given by some women, but ultimately each response could be coded into to one identifiable problem. Difficulties reported specifically by women who were artificially feeding included tongue tie, colic, lactose intolerance and problems finding correct teat.

Table 7.14. Breastfeeding difficulties in the first six weeks postpartum

Problems reported by women	Number	Percent
Positioning and attachment problems	92	38.0
Condition of baby - jaundice, low blood sugar, weight loss	37	14.2
Not enough milk	27	11.2
Engorgement or mastitis	21	8.6
Tongue tie	18	7.4
Hungry baby	16	6.6
Mother's condition - anaemia, tired, ill	10	4.1
Other (e.g. lack of support, 'lazy' baby, twins, twins, preterm)	21	8.6
Total problems	242	100

7.5.7: Practical and emotional support

Information was sought from each questionnaire relating to whether women felt supported by their partners, family and friends. Responses were given on a 5-point Likert-type scale with answers ranging from 'As much as I would like' to 'much less than I would like'. Ninety one percent of women (n=878) described their relationship with their partner as good or very good in Q1 and 89% reported that they felt they received as much practical support as they would

like and 85% felt they received as much emotional support as they would like at this time. Table 7.15 illustrates the practical support women perceived they received from partners, family and friends. A smaller percentage of women perceived positive support from their partners in late pregnancy than in early pregnancy and postpartum, and this was echoed in the perceived positive support from family and friends.

Table 7.15. Perceived practical support from partner, family and friends

	Partner			Family			Friends		
	Questionnaire			Questionnaire			Questionnaire		
	1	2	3	1	2	3	1	2	3
Support	No. (%)			No. (%)			No. (%)		
As much	846 (88.8)	580 (82.4)	465 (89.1)	755 (78.1)	508 (71.7)	431 (77.9)	697 (72.5)	485 (68.5)	407 (73.6)
In between	66 (6.9)	69 (9.8)	56 (10.7)	128 (13.2)	106 (15.0)	70 (12.7)	196 (20.4)	153 (21,6)	94 (17.0)
Not as much	41 (4.3)	55 (7.8)	31 (5.9)	84 (8.7)	95 (13.4)	52 (9.4)	69 (7.2)	70 (9.9)	52 (9.4)
Total	953	704	522	967	709	553	962	708	553

Table 7.16 shows that more women appeared to feel that they received as much emotional support as they would like from their partner and family in early pregnancy than in late pregnancy and postnatally. Emotional support from friends, however, appeared to be slightly better postnatally. The percentages varied very little, however, across the childbirth continuum.

Information was also sought in Q3 about practical and emotional support women felt they had received from the midwife delivering postnatal care during the first two weeks postpartum. Of the 544 women responding to Q3, 368 (68%) felt

they had received practical support from their midwife and 341 (63%) felt emotionally supported.

Table 7.16. Perceived emotional support from partner, family and friends

	Partner			Family			Friends		
	Questionnaire			Questionnaire			Questionnaire		
	1	2	3	1	2	3	1	2	3
Support	No. (%)			No. (%)			No. (%)		
As much	813 (85.0)	543 (77.1)	440 (79.7)	769 (79.5)	523 (74.0)	432 (78.1)	735 (76.4)	514 (72.7)	429 (77.7)
In between	85 (8.9)	100 (14.2)	63 (11.4)	121 (12.5)	111 (15.8)	75 (13.6)	161 (16.7)	131 (18.5)	89 (16.1)
Not as much	59 (6.2)	61 (8.7)	49 (8.9)	77 (8.0)	73 (10.4)	46 (8.3)	66 (6.9)	62 (8.8)	34 (6.2)
Total	957	704	552	967	703	553	962	707	552

Summary

This chapter has presented information about how women were recruited to the study and detailed subsequent response rates to postal questionnaires. As with any postal survey the response rates reduced over time, but a return rate of 75% for Q2 and 63% for Q3, with 53% of women recruited responding to all three questionnaires was encouraging and provided a large amount of data. Unfortunately, in some cases responses were not given to each question, whether deliberately or, as seems more likely, because two pages were turned over at one time leading to missing data for some of the measurement scales. To aid interpretation of results therefore a flowchart has been presented

illustrating the responses received to each measurement scale at each time point.

The chapter has presented basic social characteristics of the study sample – age, parity, occupation and ethnicity – as well as current and past medical and psychological history. Perceived levels of support from partners, family and friends have also been detailed. Birth outcomes of all the participants have been presented together with infant feeding practices. The relevance of these statistics will be discussed later in this thesis.

8. THE EMOTIONAL PROCESSING OF WOMEN

Introduction to chapter

The aim of the study was to explore the way in which women manage their emotions during the childbirth continuum in order to determine any relationships between emotional processing and the development of postnatal depression. In addition it sought to identify any changes or patterns in the emotional processing of women during pregnancy and postpartum.

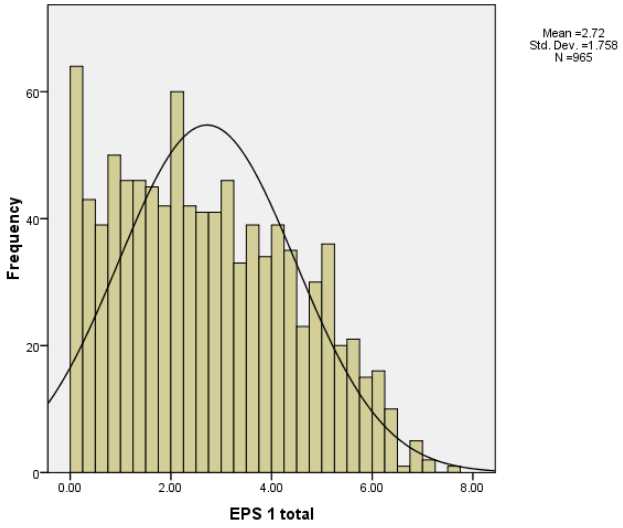
This chapter explores the emotional processing of the participants as measured on the EPS at 13 weeks and 34 weeks gestation and six weeks postpartum. Using one way repeated measures analysis of variance (ANOVA) it compares the effect that time had on mean scores. It also presents the findings of independent samples t-tests and one-way between groups ANOVA which were performed to explore any relationships between emotional processing and demographic variables such as age, parity, current health and relationship with partner. Significant shifts in the scores on the EPS are also explored. The individual sub-scales of the EPS are also explored to identify their relationships with categorical variables and any significant changes over time.

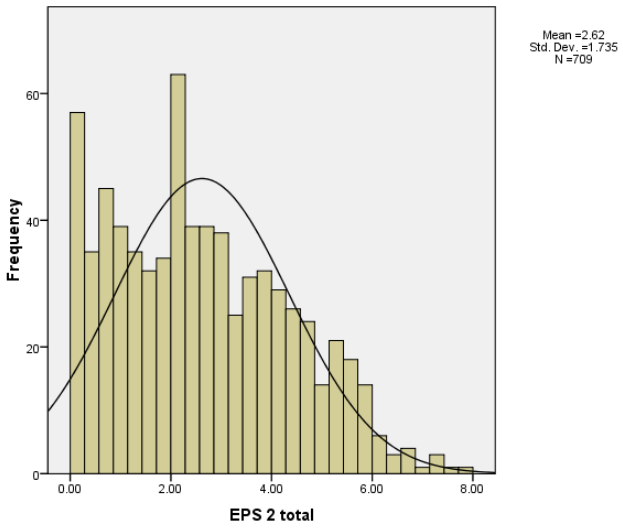
8. 1: Emotional processing scores in the antenatal and postnatal period

Emotional processing was measured at three time points (13 and 34 weeks antepartum and 6 weeks postpartum) using the EPS 1, 2 and 3. Higher scores on the EPS indicate that a person may be having difficulty processing their emotions. The raw scores for each item on the EPS are presented in Appendix 5.1. Figure 4 presents the histograms of these scores. They show that the distribution is positively skewed at each time point indicating that more women

had low EPS scores (showing appropriate processing). The Kolmogorov-Smirnov test for normality was significant at each stage ($p < 0.001$).

Figure 3 Distribution of mean EPS 1, EPS 2 and EPS 3 scores





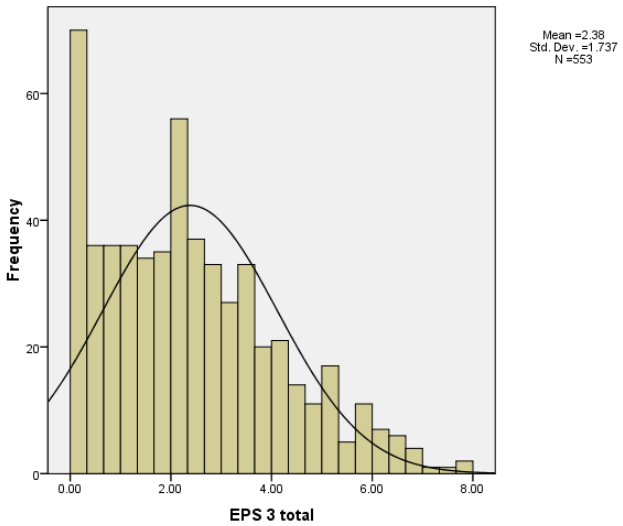


Table 8.1 shows that the total mean EPS scores of all those completing the EPS 3 postpartum were less than the total mean scores of all those completing the EPS in early and late pregnancy (EPS 1 and 2). Similarly the mean scores of all those completing the EPS 2 in late pregnancy were lower than the total mean scores in early pregnancy (EPS1).

Table 8.1. Mean EPS scores in pregnancy and postpartum

Emotional processing	Number	Missing	Mean	Std. Deviation
EPS 1 total	965	9	2.72	1.76
EPS 2 total	709	265	2.62	1.73
EPS 3 total	553	421	2.38	1.74

The relationship between the EPS scores measured at 13 and 34 weeks gestation and six weeks postpartum was investigated using Pearson's product moment correlation co-efficient. Results showed a strong positive correlation between the EPS 1 and EPS 2 ($r = 0.66$, $n = 700$, $p < 0.001$), the EPS 1 and the EPS 3 ($r = 0.57$, $n = 544$, $p < 0.001$) and between the EPS 2 and the EPS 3 ($r = 0.64$, $n = 526$, $p < 0.001$). The strength of the correlations was assessed using the guidelines suggested by Cohen (1988). The non-parametric Spearman's Rank Order correlation confirmed these findings of statistically strong positive correlations.

When the scores of the 517 women who completed the EPS at all three time points were compared using a one-way repeated measures ANOVA, results showed that the scores did not change indicating that the effect for time was not significant, although the p value was marginal (Wilk's Lambda = 0.99, F [2, 515] = 3.09, p=0.05, multivariate partial eta squared = 0.1). Table 8.2 presents the means and standard deviations and shows that the mean EPS scores of women completing all three questionnaires was 0.3 lower than the mean for all completed EPS 1 scores.

Table 8.2. Changes in mean EPS scores over time

	Mean	Std. Deviation	N
EPS 1 total	2.43	1.67	517
EPS 2 total	2.53	1.78	517
EPS 3 total	2.37	1.73	517

To attempt to address the problem of missing data from subsequent unreturned questionnaires the linear mixed-effects models (mixed) procedure was undertaken. Results showed that there were significant changes over time in the mean scores of the EPS 1, 2 and 3 (p = 0.01). Compared to the mean scores of the EPS 3 there was a mean difference of 0.17 in EPS 1 scores (95% CI 0.05 to 0.29, p=0.005) and a mean difference of 0.16 in EPS 2 scores (95% CI 0.04 to 0.29, p=0.009). Appendix 6 presents this analysis in more detail.

Mean EPS scores at each of the time points were very similar. The scores were, therefore, investigated further to discover the number of scores that improved, worsened or remained the same. The threshold of discrimination for changes was taken as half a standard deviation (SD) as identified in a systematic review of 38 studies which computed the minimally important differences in health-related quality of life measurement tools (Norman et al. 2003). As the nearest whole number above half of the SD of 1.8 for the EPS is 1, EPS scores were divided into

three categories to show a decrease of 1, an increase of 1 and those remaining the same.

Table 8.3 illustrates that there were some substantial changes in both directions between all stages. The greatest increase (worsening of emotional processing) was between early and late pregnancy, and the greatest decrease (improvement in emotional processing) was between early pregnancy and postpartum.

Table 8.3. Changes in mean EPS scores from pregnancy to postpartum

Changes in EPS scores	No.	Important reduction in EPS	No important change in EPS	Important increase in EPS
		Number (%)	Number (%)	Number (%)
Between EPS 1 and 2	699	128 (18.3)	412 (58.9)	159 (22.7)
Between EPS 1 and 3	542	134 (24.7)	293 (54.1)	115 (21.2)
Between EPS 2 and 3	525	118 (22.5)	315 (60)	92 (17.5)

8. 2 Women's scores on the emotional processing sub-scales

The mean scores on the five individual sub-scales of the EPS were also calculated and are presented in Table 8.4. The table shows that mean scores for unprocessed emotions were the highest at each of the time points and impoverished emotions were the lowest at each of the three time points.

When the individual mean sub-scale scores were compared for the 517 women who completed all three EPS scales the change over time in the mean scores for 'impoverished emotions' was significant (Wilks' Lambda = .975, p = 0.002). There was no significant effect for time on the scores on the 'unprocessed emotions', however. There were significant changes over time in the 'suppression' and 'avoidance' scores but none in 'unregulated emotions'. Table 8.5 presents full details.

Table 8.4. Mean EPS sub-scale scores at each time point

		Suppression of emotions	Unregulated emotions	Impoverished emotions	Unprocessed emotions	Avoidance of emotions
EPS 1	Number	965	965	965	968	965
	Mean	2.50	2.83	2.27	3.09	2.91
	Std. Deviation	2.06	2.06	1.83	2.25	1.86
EPS 2	Number	709	709	709	709	709
	Mean	2.46	2.73	2.09	2.96	2.84
	Std. Deviation	2.07	1.93	1.78	2.23	1.88
EPS 3	Number	553	553	554	553	554
	Mean	2.50	2.61	1.74	2.70	2.34
	Std. Deviation	2.17	1.84	1.70	2.21	1.84

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Table 8.5. Changes in EPS sub-scale scores over time

Sub-scale	Time	Number	Mean	Std. Deviation	Wilks' Lambda	F	Significance	Partial Eta squared
Suppression	Q1		2.20	1.96				
	Q2	517	2.38	2.12	.978	5.78	.003	.022
	Q3		2.50	2.15				
Unregulated emotions	Q1		2.53	1.94				
	Q2	517	2.61	1.95	-997	.690	.502	.003
	Q3		2.59	1.83				
Impoverished emotions	Q1		1.95	1.71				
	Q2	517	1.20	1.80	.975	6.561	.002	.025
	Q3		1.75	1.70				
Unprocessed emotions	Q1		2.85	2.25				
	Q2	520	2.87	2.27	.991	2.254	.106	.009
	Q3		2.69	2.19				
Avoidance	Q1		2.65	1.79				
	Q2	517	2.77	1.92	.936	17.663	.000	.064
	Q3		2.34	1.85				

8.3 Emotional processing and parity

The independent samples t-test, which compares mean values taken from two independent groups, was conducted to see whether there were differences in the mean EPS scores of primiparous and multiparous women. Results showed no significant difference at any of the three time points ($p = 0.1$, 0.9 and 0.2) indicating that women's ability to process their emotions does not differ by parity.

8.4 Emotional processing and age

One way between groups ANOVA was conducted to explore the impact of age on mean EPS scores at each time point. Ages were grouped to reflect the five categories used in the UK Infant Feeding Survey (Bolling et al. 2007) and a cluster randomised controlled trial of redesigned postnatal care (Macarthur et al. 2003). At 13 weeks antenatal there was a statistically significant difference in the EPS 1 scores for the five age groups ($F [4, 957] = 11.56$, $p < 0.001$), although the effect size (0.04), calculated using eta squared was small (using Cohen's classification). Post-hoc comparisons using the Tukey HSD test indicated that the mean EPS 1 score for the 19 and under age group was significantly higher ($m = 3.62$) than the 25 to 29 ($m = 2.76$), 30 to 34 ($m = 2.55$) and 35 and over age groups ($m = 2.35$). However, the 19 and under age group did not differ significantly from the 20 to 24 age group.

At 34 weeks gestation there were also significant differences in the EPS scores for the five age groups ($F [4, 695] = 6.3$, $p < 0.001$). Again, however, the effect size was small (0.03). Post-hoc comparisons indicated that the mean EPS 2 score for the 19 and under age group was significantly higher ($m = 3.60$) than the 30 to 34 ($m = 2.57$) and 35 and over age groups ($m = 2.23$). Their scores did not differ significantly however from the 20 to 24 and 25 to 29 age groups.

Exploration of the impact of age on postnatal scores indicated that there was no significant difference in the EPS 3 scores for the five age groups. Table 8.6 presents the mean scores, standard deviations and confidence intervals for the five age groups at each time point. The scores show that at each antenatal time point the 19 and below age group had the highest mean scores, although postpartum the 20 to 24 age group was marginally higher. The 35 and over age group had the lowest mean scores at each time point.

Table 8.6. Mean EPS scores at three time points according to age group

					95% Confidence Interval for Mean	
Emotional processing	Age	Number	Mean	Std. Deviation	Lower Bound	Upper Bound
EPS 1	19 and under	49	3.62	1.59	3.16	4.07
	20 to 24	117	3.41	1.86	3.07	3.75
	25 to 29	260	2.76	1.66	2.56	2.96
	30 to 34	303	2.55	1.71	2.36	2.74
	35 and over	233	2.35	1.76	2.12	2.57
	Total	962	2.72	1.76	2.60	2.83
	Missing	3				
EPS 2	19 and under	27	3.60	1.79	2.60	2.83
	20 to 24	69	3.09	1.88	2.89	4.31
	25 to 29	187	2.75	1.78	2.64	3.54
	30 to 34	228	2.57	1.69	2.49	3.01
	35 and over	189	2.23	1.61	2.34	2.79
	Total	700	2.62	1.74	2.00	2.46
	Missing	9				
EPS 3	19 and under	16	2.41	1.81	1.45	3.37
	20 to 24	44	2.93	2.29	2.24	3.63
	25 to 29	149	2.30	1.72	2.02	2.58
	30 to 34	187	2.38	1.63	2.14	2.61
	35 and over	150	2.26	1.68	1.99	2.53
	Total	546	2.37	1.74	2.22	2.52
	Missing	7				

Repeated measures ANOVA were then used to determine whether age had any significant effect on the EPS scores over the three time periods. A total of 517 women provided data for these tests. The results showed that the interaction effect was significant ($p = 0.01$) indicating that the change over time differed between the age groups. The main effect for time was also significant (Wilks' Lambda 0.98, $p = 0.02$). The main effect for the age group was significant ($p = 0.02$) showing that there were significant differences in the EPS scores for the different age groups. Using Cohen's classification, the effect size was small (0.02).

The individual sub-scale scores were also explored to see if there were differences in scores depending on the age of the women. Table 8.7 presents the mean score and standard deviation for each age group at each time point.

Table 8.7. EPS sub-scale scores according to age group

Sub-scale		EPS 1		EPS 2		EPS 3	
	Age	Mean	SD	Mean	SD)	Mean	SD
Suppression	19 and under	2.67	1.80	3.36	2..23	3.19	2.53
	20 to 24	2.61	2.04	2.76	2.40	3.01	2.66
	25 to 29	2.28	2.11	2.66	2.27	2.48	2.09
	30 to 34	2.13	1.80	2.30	2.10	2.42	2.07
	35 and over	2.00	1.95	1.99	1.83	2.38	2.12
	Total	2.19	1.96	2.38	2.12	2.50	2.15
Unregulated emotions	19 and under	2.94	1.37	3.39	2.19	2.54	1.93
	20 to 24	3.46	2.25	3.02	2.27	2.97	2.23
	25 to 29	2.67	2.09	2.72	2.02	2.51	1.80
	30 to 34	2.45	1.80	2.66	1.87	2.61	1.77
	35 and over	2.16	1.81	2.25	1.80	2.50	1.73
	Total	2.53	1.94	2.61	1.95	2.58	1.82
Impoverished emotions	19 and under	2.60	1.32	3.40	1.99	2.11	1.71
	20 to 24	2.69	2.02	2.40	2.11	2.42	2.052
	25 to 29	2.01	1.83	2.15	1.95	1.63	1.66
	30 to 34	1.87	1.57	2.00	1.69	1.75	1.62
	35 and over	1.70	1.63	1.60	1.55	1.64	1.68
	Total	1.95	1.70	2.00	1.99	1.75	1.70
Unprocessed emotions	19 and under	2.82	1.53	4.06	2.47	2.55	2.03
	20 to 24	3.61	2.44	3.10	2.41	3.42	2.90
	25 to 29	3.22	2.36	3.18	2.35	2.64	2.19
	30 to 34	2.65	2.11	2.80	2.15	2.74	2.06
	35 and over	2.50	2.21	2.47	2.22	2.44	2.10
	Total	2.84	2.25	2.87	2.27	2.68	2.19
Avoidance	19 and under	2.83	1.35	3.59	2.14	2.30	2.24
	20 to 24	3.20	1.65	2.92	2.15	2.80	2.07
	25 to 29	2.87	1.80	3.00	1.96	2.23	1.87
	30 to 34	2.60	1.74	2.72	1.87	2.40	1.75
	35 and over	2.27	1.86	2.45	1.80	2.23	1.85
	Total	2.64	1.79	2.76	1.91	2.34	1.85

Numbers of participants in each group: 19 and under = 14, 20 to 24 = 42, 25 to 29 = 143, 30 to 34 = 175, 35 and over = 142. Total 516.

Results from repeated measures ANOVA showed that the interaction effect between age and each of the sub-scales measured over time, was significant for 'unregulated emotions' ($p = 0.04$) and 'avoidance' ($p = 0.01$), but not for 'impoverished emotions' ($p = 0.13$), 'unprocessed emotions' ($p = 0.13$) and 'suppression' ($p = 0.43$). With the exception of 'unregulated emotions' the effect for time was significant for each of the subscales ('suppression', $p = 0.02$, 'impoverished emotions', $p < 0.001$, 'unprocessed emotions', $p = 0.04$, 'avoidance', $p < 0.001$, 'unregulated emotions', $p = 0.28$). There was no significant difference in the 'suppression' and 'avoidance' scores for the five age groups ($p = 0.08$, and $p = 0.10$). There were however statistically significant differences in the 'unregulated' ($p = 0.02$),' impoverished' ($p = 0.03$) and 'unprocessed' ($p = 0.02$) emotion scores for the five age groups. The effect size in each case was small. With 'unregulated' and 'impoverished' emotions the 20 to 24 age group had the highest mean score with the 19 and under the next highest in both early pregnancy and postpartum. In late pregnancy the 19 and under age group had the highest mean score with the 20 to 24 group following. 'Unprocessed emotions' mean scores followed a similar pattern with the highest scores in early pregnancy and postpartum being in the 20 to 24 age group and in late pregnancy in the 19 and under group. The second highest scores in early and late pregnancy however were in the 25 to 29 age group and postpartum in the 30 to 34 group (Table 8.7).

8.5 Emotional processing and socioeconomic status

One way between groups ANOVA was used to explore the impact of SES status on the mean EPS scores of the participants in early pregnancy. Results showed that there were statistically significant differences in the EPS scores across the groups ($F [5, 949] = 3.44$, $p = 0.004$). The effect size, calculated using eta squared was small (0.02). Post-hoc comparisons using Tukey HSD indicated that the mean score for the managerial/professional group ($m=2.37$, $SD=1.62$) was

significantly different from the lower supervisory/technical group (m=3.07, SD=1.68) and the unemployed/unclassified group (m=2.94, SD=1.85).

8.6 Emotional processing and physical health

Women were asked in Q1 to identify whether they were suffering from a current medical problem for which they were receiving treatment from their GP. In Q2 they were again asked whether they were receiving treatment from their GP during pregnancy and whether they had been admitted to hospital. Independent samples t-tests were undertaken to determine whether the mean scores on the EPS differed in those women who were receiving treatment for physical conditions and those who were not.

Results showed that there were no significant differences in the mean scores at any stage for women being treated for a medical condition when they completed Q1. Women who reported in Q2 that they had received treatment from their GP since becoming pregnant did not have significantly higher EPS scores in late pregnancy and postpartum than those not receiving treatment. There was no significant difference in the EPS scores in late pregnancy and postpartum between those women who reported in Q2 that they had been admitted to hospital during their pregnancy and those who had not.

8.7 Emotional processing and mental health

In Q1 women were asked if they were currently being treated by their GP or psychiatrist for a psychological condition. They were also asked to identify any past referrals to a psychiatrist, any treatment for anxiety or depression from their GP in the past, a history of postnatal depression and a history of psychiatric conditions in close family members.

Thirty four women (3%) who reported that they were being treated for a psychological condition in early pregnancy (Q1) had significantly higher mean EPS scores in early pregnancy (m = 3.9, SD 1.6, p <0.001, mean difference 11.24 95% CI -1.84 to -0.64 for Q 1) than those not receiving treatment (m= 2.7). Twenty of these women continued to complete Q2 and again their scores were significantly higher (m = 3.7, SD 1.6, p = 0.003, -1.16 95% CI -1.94 to -0.39) than those women who were not being treated for a psychological condition (m = 2.6). There were no significant differences in scores postpartum however for the 14 women who reported treatment for a psychological problem in early pregnancy and continued to complete Q3.

Those women who reported in Q1 that they had been treated for depression in the past (n = 215) had significantly higher mean EPS 1 scores (m = 3.6, SD 1.8, p <0.001, mean difference = 1.13 95% CI -1.39 to -0.88) than those who had not (m = 2.5). One hundred and forty eight of these women continued to complete Q2 and 107 to complete Q3. Again they had significantly higher EPS scores (m = 3.7, SD 1.8, p <0.001, mean difference = -1.34 95% CI -1.64 to -1.44 at Q2, m = 3.3, SD 1.9, p <0.001, mean difference = 1.21 95% CI -1.56 to -0.86 at Q3) than those who had not reported a history of depression (m = 2.3 and m = 2.1). Those women who had suffered from a psychological condition requiring psychiatric treatment in the past (n = 77) also had significantly higher mean EPS scores in early pregnancy (m = 3.4, SD 2.0, p <0.001, mean difference = -0.73, 95% CI -1.13 to -0.32) than those without a history of psychiatric treatment (m= 2.6). Fifty eight of these women continued to complete Q2 and 42 to complete Q3 and again their EPS scores were significantly higher than those who had not had a past psychiatric referral (m = 3.1, SD 1.7, p = 0.02, mean difference -0.57, 95% CI -1.03 to -0.10 at Q2, m = 3.1, SD 1.8, p = 0.003, mean difference = -0.83, 95% CI -1.37 to -0.28 at Q3). The mean scores of the non-treatment group were 2.6 in late pregnancy and 2.3 postpartum.

Women who reported in Q1 that they had received treatment for anxiety in the past (n = 120) had significantly higher EPS 1 scores (m = 3.2, SD 1.8, p < 0.001,

mean difference = 0.59, 95% CI -0.92 to -0.25) than those women not suffering from anxiety (m = 2.6). Eighty eight of these women continued to complete Q2 and again they had significantly higher EPS scores (m = 3.1, SD 1.7, p = 0.006, mean difference = -0.54, 95% CI -0.93 to -0.15) than the non-anxious group (m = 2.5). Postnatally however there was no significant difference between the 59 women with a history of anxiety who continued to complete this Q3 and those without an anxiety history.

The 76 multiparous women (15%) who identified in Q1 that they had suffered from postnatal depression in previous pregnancies had significantly higher mean EPS 1 scores (m = 3.7, SD 1.8, p <0.001, mean difference = 1.27, 95% CI 0.85 to 1.69) than those who did not suffer (m = 2.5). Of these women 44 continued to complete Q2 and 27 to complete Q3. In late pregnancy and postpartum their scores were again significantly higher (m = 3.8, SD 1.7, p <0.001, mean difference = 1.37, 95% CI 0.84 to 1.90 on Q2, m = 3.5, SD 1.4, p <0.001, mean difference = 1.29, 95% CI 0.63 to 1.94 on Q3). Those who did not suffer from postnatal depression had mean scores of 2.5 on the EPS 2 and 2.2 on the EPS 3.

Women who identified in Q1 that they had a family history of depression (n = 336) also had significantly higher mean EPS scores at the time of completing Q1 (m = 3.1, SD 1.8, p <0.001, mean difference = -0.60, 95% CI -0.83 to -0.37) than those without a family history (m = 2.5). Two hundred and forty one women continued to complete Q2 and 189 to complete Q3 and their EPS scores were significantly higher (m = 2.9, SD 1.7, p <0.001, mean difference = -0.49, 95% CI -0.76 to – 0.22 on Q2, m = 2.7, SD 1.7, p <0.001, mean difference = -0.55, 95% CI -0.85 to -0.24 on Q3). Those without a family history of psychological problems had mean scores of 2.4 on the EPS 2 and 2.2 on the EPS 3.

The mean EPS scores of women who reported receiving fertility treatment were also explored. Forty six women responding to Q1 had received treatment, and 38 of these responded to Q2 and 31 to Q3. No significant differences were found

between the mean EPS scores of these women and women who conceived naturally at any of the time points (p = 0.70, 0.58 and 0.84).

8. 8 Emotional processing and relationship with partner

An independent samples t-test was undertaken to determine whether women without a partner had more difficulty processing their emotions than those with a partner. Table 8.8 shows that at 13 weeks gestation the 19 women who did not have a partner had higher mean scores on the EPS than those with a partner.

Table 8.8. EPS scores and relationship with partner

	Emotional processing	Partner present			
		Yes	No	Missing	Total
EPS 1	Number	944	19	1	965
	Mean score	2.68	4.30		
	SD	1.74	2.21		
	Sig (2 tailed)	<0.001			
	Mean difference (95% CI)	1.62 (-2.41, -0.82)			
EPS 2	Number	692	9	8	709
	Mean score	2.60	4.00		
	SD	1.73	2.03		
	Sig (2 tailed)	0.02			
	Mean difference (95% CI)	1.40 (-2.55, -0.26)			
EPS 3	Number	541	6	6	553
	Mean score	2.36	3.60		
	SD	1.72	2.94		
	Sig (2 tailed)	0.35			
	Mean difference (95% CI)	-1.23 (-4.32, 1.85)			

The mean difference of 1.6 between the scores of those with and those without a partner was significant. At 34 weeks gestation the nine women who did not have a partner at this time also scored higher, with a significant mean difference of 1.4. Postpartum, however, the mean EPS 3 score of six women who did not have a partner at this time was not significantly different from those women who did have a partner.

Summary

This chapter has presented the mean EPS scores over the three time points (early and late pregnancy and postpartum) together with the individual sub-scale scores for those periods. It has shown that the significance that time made to the mean EPS scores was of borderline significance (although when measures were taken to account for the data lost from unreturned questionnaires significant changes in scores over time were found). It has also shown that the greatest increase in mean EPS scores, indicating a deterioration in emotional processing, was from early to late pregnancy and the greatest decrease, indicating an improvement in processing, was between early pregnancy and postpartum.

The chapter has also presented the mean scores for the EPS sub-scales over the three time points, showing that 'impoverished emotions' had the lowest score at each time point and 'unprocessed emotions' the highest. There were significant differences over the three time points in the scores for 'impoverished emotions', 'suppression' and 'avoidance', but changes in 'unprocessed' and 'unregulated emotions' were not significant.

When the relationship between categorical variables and mean EPS scores was examined results showed that parity made no difference to EPS scores, while younger age groups had higher mean scores, indicating more difficulty processing their emotions. Within the sub-scale analysis age was seen to make a significant difference to unregulated, impoverished and unprocessed emotions.

Women from higher managerial/professional groups had lower EPS scores while single women had significantly higher EPS scores during pregnancy.

The chapter has also shown that while physical health does not appear to make a significant difference to the mean EPS scores, women undergoing current or past treatment for psychological conditions and those having a history of postnatal depression had significantly higher EPS scores, especially in early and late pregnancy.

The implications of these findings will be discussed in a later chapter.

9. THE PSYCHOLOGICAL HEALTH OF WOMEN

Introduction to chapter

This chapter presents the psychological health of the participants as measured on the EPDS at the three time points of 13 weeks and 34 weeks gestation and six weeks postpartum. Using one way repeated measures analysis of variance (ANOVA) it compares the effect that time had on the mean EPDS scores. It also presents the findings of independent samples t-tests and one-way between groups ANOVA which were performed to explore any relationships between the EPDS and demographic variables such as age, parity, current health and partnerships. Scores above and below the threshold of 13 are explored to determine any patterns emerging in the development of depression during pregnancy and postpartum. Significant shifts in the scores on the EPDS are also explored.

9.1 Depression scores over time

Scores from the EPDS indicate the likelihood of women suffering from depression antenatally and postpartum. Higher scores indicate a greater possibility of depression, the highest possible score being 30 and the lowest possible score 0. The threshold to determine high scores in this study is 13 and above. The raw scores for each item on the EPDS are presented in Appendix 5.2.

Table 9.1 illustrates the mean scores for those women completing the EPDS 1 in early pregnancy, those women completing the EPDS 2 in late pregnancy and those women completing the EPDS 3 at six weeks postpartum. It shows that the mean scores of those women completing the EPDS in early pregnancy were

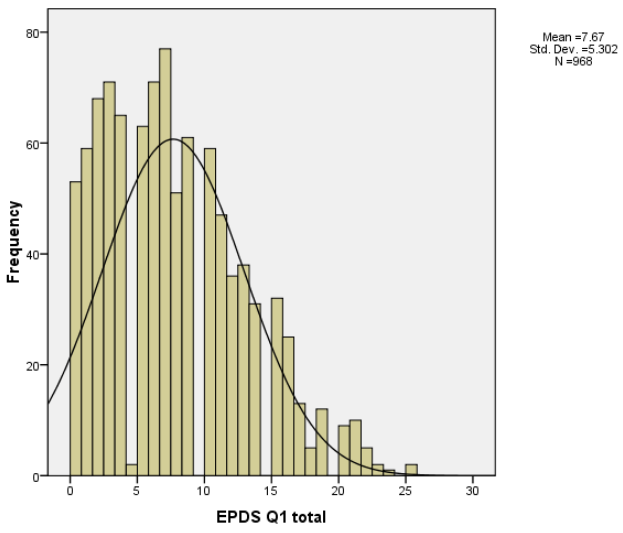
higher than those of women completing in late pregnancy and those in late pregnancy were higher than those completing postpartum.

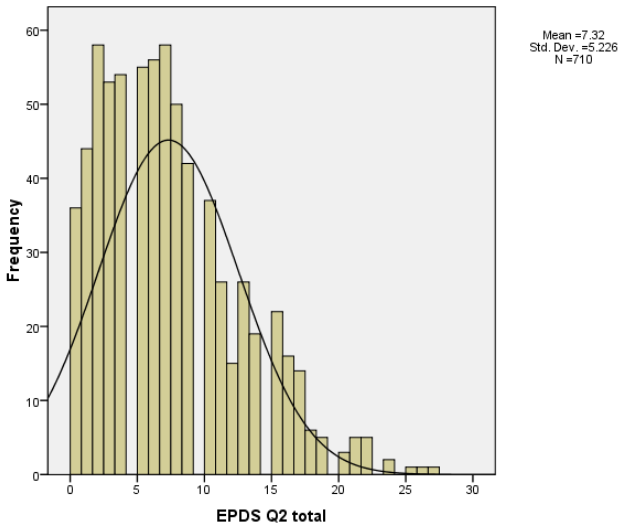
Table 9.1. Mean EPDS scores in early and late pregnancy and postpartum

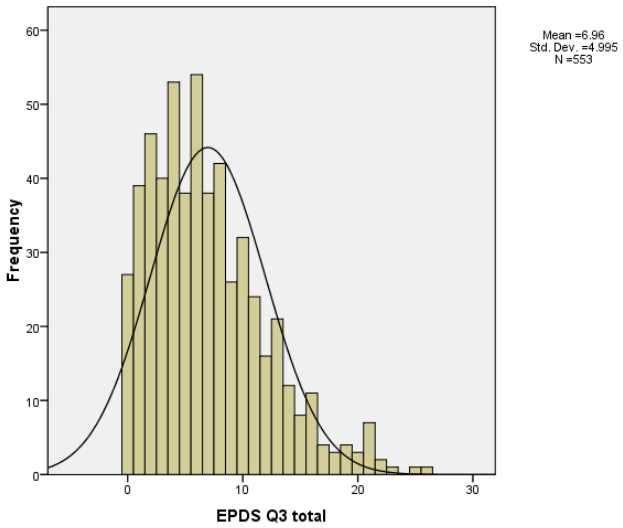
Depression	Number	Missing	Mean	Std. Deviation
EPDS 1 total	968	6	7.67	5.30
EPDS 2 total	710	264	7.32	5.22
EPDS 3 total	553	421	6.96	5.00

Figure 5 shows the distribution of mean scores at each of the time points. They illustrate that the scores were positively skewed. However, in view of the large sample size most analyses undertaken have been based on the underlying assumption that data are normally distributed. The justification for this assumption is discussed in more detail in Chapter 16. The Kolmogorov-Smirnov test was significant at each time point ($p < 0.001$).

Figure 4. Distribution of EPDS 1, EPDS 2 and EPDS 3 scores







One way repeated measures ANOVA showed that the mean scores of the 520 women who completed the EPDS 1, 2 and 3 were very similar at each time point (Table 9.2). There was no significant effect for time on the EPDS scores (Wilk's Lambda =1, F [2, 518] = 0.08, p = 0.93, multivariate partial eta squared = 0).

Table 9.2. Comparison of EPDS scores over time

Depression	Mean	Std. Deviation	N
EPDS 1	7.02	5.25	520
EPDS 2	7.06	5.23	520
EPDS 3	6.98	5.02	520

To attempt to address the problem of missing data from subsequent unreturned questionnaires mixed models analysis was undertaken. The test for fixed effects was insignificant (p = 0.31) indicating that the mean EPDS score did not change over time. (Mixed models analysis is presented in Appendix 6).

As the mean EPDS scores at each of the time points were very similar, the scores were investigated further to discover the number of individual scores that improved, fell and remained the same. This was undertaken using the discrimination of half a SD for changes, mentioned in the previous chapter (Norman et al. 2003). As the nearest whole number above half of the SD of 5 for the EPDS is 3, EPDS scores were divided into three categories to show a decrease of 3 or more, an increase of 3 or more and those remaining the same. Table 9.3 illustrates that approximately half of the scores remained the same throughout the childbirth continuum. The greatest important increase in scores (indicating a higher risk of postnatal depression) and the greatest decrease in scores (indicating an improvement in depression status) both occurred between early pregnancy and postpartum.

Table 9.3. Important changes in EPDS scores from pregnancy to postpartum

Changes in EPDS scores	No.	Important reduction in EPDS	No important change in EPDS	Important increase in EPDS
		Number (%)	Number (%)	Number (%)
Between EPDS 1 and 2	703	187 (25.3)	345 (49.1)	180 (25.6)
Between EPDS 1 and 3	546	150 (27.5)	244 (44.7)	152 (27.8)
Between EPDS 2 and 3	526	129 (24.5)	266 (50.6)	131 (24.9)

9.2 High and low depression scores

In order to determine how many women were at risk of depression during and after their pregnancy, scores were dichotomized using a threshold of 13. Table 9.4 shows the number of women who had high EPDS scores at each time point.

It illustrates that there was a larger percentage of women completing Q1 who were likely to be depressed than the percentages completing Q2 and Q3. The percentage of women with probable postnatal depression, as identified by scores on the EPDS 3 was 14%. Cochrane's Q test, however, determined that these results were not significant (Cochrane's Q = 2.145, df = 2, p = 0.34).

Table 9.4. High and low EPDS scores over time

EPDS	Below 13	13 and above	Total	Missing
	Number (%)	Number (%)	Number	Number
EPDS 1 (13 weeks a/n))	783 (81)	185 (19)	968	6
EPDS 2 (34 weeks a/n)	584 (82)	126 (18)	710	264
EPDS 3 (6 weeks p/n)	475 (86)	78 (14)	553	421

9.3 Depression and parity

Independent samples t-tests showed that were also no statistically significant differences in EPDS scores in early and late pregnancy between primiparous and multiparous women. There was however a significant difference of 1.1 (p = 0.007, 95% CI 0.31 to 1.98) between the mean postnatal EPDS scores of primiparous women (m = 7.54, SD 5.29) and multiparous women (m = 6.39, SD 4.66). The effect size, using eta squared, was 0.01, which, using the guidelines proposed by Cohen (1988), was small.

Repeated measures ANOVA showed that parity had no significant effect on the mean EPDS scores (p = 0.96), and the change in EPDS scores for primiparous and multiparous women was not statistically significant (p = 0.08).

A total of 265 primiparous women provided EPDS 3 scores. When the scores were dichotomized into high (13 and above) and low scores (12 and below) 77 women had high scores. Of these, 45 (57%) were primiparous women. Thirty two women (12%) were multiparous. However there was no statistically

significant difference between the percentage of primiparous and multiparous women who scored 13 and above.

9.4 Depression and age

One way between groups ANOVA showed statistically significant differences in EPDS scores by age at each time point antenatally ($p < 0.001$) but not in the postnatal scores. In early pregnancy there were significant differences between the 19 and under age group, the highest scoring, and each of the others except the 20 to 24 group (with a mean difference of 3.51 [95% CI 1.27 to 5.76] between them and the lowest scoring 35 and over group). There were also significant differences between the 20 to 24 age group and the 25 to 29 and the 35 and over groups, and also between the 30 to 34 and the 35 and over age groups in early pregnancy. In late pregnancy there were again significant differences ($p = <0.001$) between the 19 and under group and each of the others with the exception of the 20 to 24 group (with a mean difference between the 19 and under group and the lowest scoring over 35 group of 4.41, 95% CI 1.71 to 7.50) There were also statistically significant differences between the 25 to 29 group and 35s and over (mean difference 1.53, 95% CI .08 to 2.98) and between the 30 to 34 group and the 35s and over (mean difference 1.43, 95% CI .05 to 2.81). Table 9.5 shows the mean scores of each age group at each time point. Postnatally there were no significant differences in EPDS scores between the age groups.

Repeated measures ANOVA were then used to determine whether age had any significant effect on the EPDS scores over the three time periods. A total of 519 women provided data for these tests. The results showed that the interaction effect was not significant ($p = 0.36$) indicating that there was the same change in scores over time for the different age groups. The main effect for time was not significant (Wilks' Lambda 1.0, $p = 3.80$).

Table 9.5. Mean EPDS scores according to age group

					95% Confidence Interval for Mean	
Depression	Age	Number	Mean	Std. Deviation	Lower Bound	Upper Bound
EPDS 1	19 and below	49	10.0	5.4	8.5	11.5
	20 to 24	117	9.2	5.5	8.2	10.2
	25 to 29	260	7.5	5.0	7.0	8.1
	30 to 34	304	7.7	5.4	7.1	8.4
	35 and over	235	6.5	5.0	5.9	7.1
	Total	965	7.7	5.3	7.3	8.0
	Missing	9				
EPDS 2	19 and below	27	10.6	5.8	8.3	12.9
	20 to 24	69	9.0	5.7	7.6	10.4
	25 to 29	187	7.5	5.2	6.8	8.3
	30 to 34	228	7.4	5.2	6.7	8.1
	35 and over	190	6.0	4.7	5.3	6.7
	Total	701	7.3	5.2	6.9	7.7
	Missing	8				
EPDS 3	19 and below	16	6.4	4.6	4.0	8.9
	20 to 24	44	9.0	7.0	6.9	11.1
	25 to 29	150	7.1	5.0	6.3	7.9
	30 to 34	187	6.9	5.0	6.2	7.6
	35 and over	149	6.3	4.6	5.6	7.0
	Total	546	7.0	4.99	6.51	7.35
	Missing	7				

9.5 Depression and socioeconomic status

One way ANOVA was used to explore the impact of SES (as judged by occupation) on the mean EPDS scores of the participants. Results showed that there were no statistically significant differences in the scores of the occupation groups at any stage.

9.6 Depression and physical and psychological health

Independent samples t-tests were undertaken to determine whether mean EPDS scores differed if women were receiving treatment from their GP for physical or psychological health problems.

Results showed that there were no statistically significant differences in the mean EPDS scores at any stage for the women who reported at 13 weeks that they were being treated for a physical condition compared with those who were not. Three hundred and four women completing the EPDS 2 admitted to having received treatment from their GP during their pregnancy. In all but seven cases the reason was reported as a physical problem. Analysis showed that there was a significant difference between their EPDS 2 scores (m = 7.85, SD 5.65, p= 0.2, mean difference = 0.93, 95% CI 0.14 to 1.72) and those who did not receive treatment, with those receiving treatment having higher scores. Two hundred and twenty two women who received treatment from their GP during pregnancy went on to complete Q3. There were no significant differences between their EPDS 3 scores and those of women who did not receive treatment however.

Ninety five women completing the EPDS 2 admitted to having a hospital admission during their current pregnancy. There were significant differences in the EPDS scores at 34 weeks between these women (m = 8.5, SD 5.5, p = 0.015, mean difference = 1.4, 95% CI 0.28 to 2.53) and those not experiencing a hospital admission, with those women admitted to hospital scoring higher. Postnatal EPDS scores, however, did not differ significantly.

In contrast 34 women (3%) who reported in Q1 that they were being treated for a psychological condition, had significantly higher mean EPDS 1 scores (m = 13.15, SD 5.66, p <0.001, mean difference 5.70, 95% CI -7.47 to – 3.91). Twenty of these women continued to complete Q2 and again there was a significant difference between their EPDS 2 scores (m = 12.40, SD 6.76, p = 0.003, mean

difference 5.2, CI -8.40 to – 2.03) and those of women not reporting current psychological problems in Q1. Fourteen women who reported psychological conditions in early pregnancy continued to complete Q3 but there were no significant differences between their scores and the scores of other women.

Two hundred and sixteen women completing the EPDS 1 reported a history of depression treated by the GP. There were significant differences between their EPDS 1 scores (m = 10.75, SD 5.90, p <0.001, mean difference 4.0, 95% CI – 4.85 to – 3.13) and those of women without a history of depression with the scores of the history of depression group being higher. One hundred and forty eight of these women went on the complete the EPDS 2 and 107 to complete the EPDS 3. There were again significant differences between their scores with the mean scores of those of women who did suffer from depression in the past being higher than those who did not (m = 10.67, SD 5.69, p <0.001, mean difference = 4.22, 95%, CI – 5.22 to – 3.21 at Q2 and m = 9.64, SD 5.73, p <0.001, mean difference = 3.33, 95% CI – 4.51 to -2.16).

One hundred and twenty women completing the Q1 reported receiving treatment from their GP for anxiety in the past. Their EPDS 1 scores were significantly higher than non-anxious women (m = 10.04, SD 5.94, p <0.001, mean difference = 2.72, 95% CI – 3.85 to – 1.60). Eighty eight of these women continued to complete Q2 and 59 to complete Q3, and again their EPDS scores were significantly higher (m = 9.41, SD 5.23, p <0.001, mean difference = 2.36, 95% CI -3.53 to -1.2 at Q2 and m = 8.80, SD 5.72, p = 0.003, mean difference = 2.07, 95% CI -3.41 to -0.72at Q3).

Women reporting a previous history of postnatal depression in Q1 (n =76) had significantly higher mean EPDS 1 scores than those with no history (m = 10.71, SD 5.84, p <0.001, mean difference = 3.3, 95% CI 2.57 to 5.08). Forty five of the women continued to complete Q2 and 27 to complete Q3. Again the EPDS 2 and EPDS 3 scores of those women were significantly higher than the scores of women who did not suffer from postnatal depression (m = 11.47, SD 5.72, p =

<0.001, mean difference 4.40, 95% CI 2.82 to 6.40 at Q2, m = 9.85, SD 4.50, p <0.001, mean difference = 3.05, 95% CI 1.94 to 5.53).

Women reporting a family history of depression in Q1 (n = 338) also had significantly higher mean EPDS 1 scores than those without a family history (m = 8.86, SD 5.40, p <0.001, mean difference = 1.87, 95% CI – 2.56 to -1.18). Two hundred and forty two women went on the complete Q2 and 189 to complete Q3 and again there were significant differences between their EPDS 2 and 3 scores and the scores of women without a family history of depression (m = 8.54, SD 5.33, p <0.001, mean difference 1.82, 95% CI -2.62 to – 1.01 at Q2, m = 8.06, SD 5.14, p <0.001, mean difference = 1.68, 95% CI -2.55 to – 0.80).

9.7 Depression and single status

An independent samples t-test was undertaken to determine whether women without a partner scored higher on the EPDS than those with a partner. Table 9.6 presents the results. Nine hundred and forty seven women reported in Q1 that they had a partner and 19 said that they did not. There was a significant difference in their mean EPDS 1 scores (p = 0.004, CI – 8.47 to – 1.90), with the scores of women without a partner being 5.19 higher than those with a partner (m = 12.75, SD 6.78 and m = 7.56, SD 5.23). The scores of those women without a partner did not differ significantly from the scores of those with a partner in late pregnancy and postpartum. Table 9.6 presents results from repeated measures ANOVA which demonstrated that difference in EPDS scores between those with and without a partner were not significant (p = 0.32).

Table 9.6. EPDS scores and relationship with partner

EPDS		Partner present			
		Yes	No	Missing	Total
EPDS 1	Number	947	19	2	968
	Mean score	7.56	12.75		
	SD	5.23	6.78		
	Sig (2 tailed)	0.004			
	Mean difference (95% CI)	-8.47, -1.91			
EPDS 2	Number	693	9	8	710
	Mean score	7.28	11.86		
	SD	5.19	7.62		
	Sig (2 tailed)	0.11			
	Mean difference (95% CI)	-10.45, 1.28			
EPDS 3	Number	541	6	6	553
	Mean score	6.91	9.67		
	SD	4.96	7.79		
	Sig (2 tailed)	0.43			
	Mean difference (95% CI)	-10.92, 5.42			

9.8 Depression and birth experiences

One–way ANOVA was undertaken to determine any significant differences in the mean postnatal EPDS scores of women depending on whether they birthed normally, or with the aid of forceps, had a ventouse extraction or an elective or emergency caesarean section. Results showed that there was no significant difference in the EPDS 3 scores of the groups ($F [4, 548] = 2.44$, $p = 0.46$).

The chi-square test for independence was performed to determine any relationship between type of birth and high EPDS 3 scores (as determined by scores of 13 and over. The test showed significant differences (Pearson chi square 14.36, 4df, p = 0.006), with 11.2% of women (n = 40) who experienced a normal birth having high EPDS 3 scores (which accounted for 51.3% of women scoring 13 and above) while just over a quarter of women who experienced elective (n = 10) and just under a quarter who experienced emergency caesarean section (n = 17) had high scores. In total these accounted for 34.6% of women who had high scores on the EPDS 3. The figures are shown in Table 9.7.

Table 9.7. EPDS 3 scores according to type of birth

		EPDS 3 scores		
Type of birth		12 and below	13 and above	Total
Normal	Number	316	40	356
	Percent	88.8%	11.2%	100.0%
Ventouse	Number	34	5	39
	Percent	87.2%	12.8%	100.0%
Forceps	Number	45	6	51
	Percent	88.2%	11.8%	100.0%
Caesarean section	Number	80	27	107
	Percent	74.8%	25.2%	100.0%

There was also a statistically significant relationship between women's satisfaction with their birth experience and high scores on the EPDS 3 with 36 (46%) of the 78 women who had EPDS scores of 13 and above at 6 weeks postpartum being unhappy with their birth experience compared with 42 (54%) of women who had EPDS of 12 or less (chi square test for independence with Yates correction for continuity 19.82, p <0.001). Seventy two (92%) of the high scoring group had reported physical problems related to the birth compared with 360 (76%) of the low scoring group. These figures were significant (Yates continuity correction 9.44, p = 0.002).

Sixty percent (n = 47) of women with high EPDS 3 scores had problems with feeding their baby compared with 40% (n = 31) of women with EPDS score of 12 or less. This difference was significant (Yates continuity correction 5.79, p = 0.02).

Summary

The chapter explored the effect of time on mean EPDS scores, and concluded that EPDS scores did not change over time, although the greatest increase and the greatest decrease occurred between early pregnancy and postpartum.

The chapter continued by presenting patterns in the EPDS scores during pregnancy and postpartum depending on a variety of demographic factors. It showed that parity and SES made no difference to EPDS scores at any stage, but age and partnership status did, with women in the youngest age group and those without a partner scoring significantly higher than women of 35 years and over and those with a partner at both stages during pregnancy.

The chapter also reported on the relationship between physical and mental health disorders and EPDS scores. It showed that women suffering from physical disorders at the start of pregnancy were no more likely to develop depression at any time during pregnancy or in the postpartum period than those who were well. However, women who were treated by their GP or admitted to hospital for treatment during their pregnancy were more likely to score higher on the EPDS in late pregnancy but not postpartum. Women with personal current or previous history or a family history of psychiatric disorders however were significantly more likely to have higher scores on the EPDS during pregnancy and postnatally, although those suffering from a psychological disorder at the time of completing the first questionnaire only appeared to have higher scores during pregnancy. Women who reported suffering from postnatal depression in the past had significantly higher EPDS scores at each point in pregnancy and postpartum.

The chapter concluded by reporting on the relationship between birth experiences and postpartum EPDS scores showing that the type of birth a woman experienced made no difference to mean EPDS scores, although a greater percentage of women experiencing a normal birth than those experiencing caesarean section had EPDS 3 scores above the threshold of 13. Women who were dissatisfied with their birth experience or who physical problems postnatally were also more likely to have high EPDS scores.

10. THE PHYSICAL AND MENTAL WELLBEING OF WOMEN

Introduction to chapter

This chapter presents details of the physical and mental wellbeing of the participants. Women's general wellbeing was measured using the physical component summary (PCS) and the mental component summary (MCS) of the SF-36. Higher scores indicated better health. Using one way repeated measures analysis of variance (ANOVA) it compares the effect that time had on each of the measures. It also presents the findings of independent samples t-tests and one-way between groups ANOVA which were performed to explore any relationships between these factors and demographic variables such as age, parity, current health and relationship with partner. Scores of the individual domains of the SF-36 have also been explored to allow comparisons with other studies that have presented these figures.

10.1 PCS and MCS scores over time

From the mean physical component scores (PCS) it appears that women completing Q2 later in pregnancy felt less well physically than women completing Q1 in early pregnancy and Q3 postpartum. The average score for the mental component scores (MCS) was less in early pregnancy than late pregnancy and slightly less than postpartum. Higher mean scores were found in late pregnancy, indicating that the mental wellbeing for those women completing Q2 was better. Table 10.1 presents these figures.

Table 10.1. Mean SF-36 scores in early and late pregnancy and postpartum

Physical and mental wellbeing	Number	Mean	Std. Deviation
SF36 PCS 1	948	50.0	7.0
SF36 PCS 2	704	42.2	8.4
SF36 PCS 3	547	50.4	8.6
SF36 MCS 1	948	45.6	9.4
SF36 MCS 2	704	50.3	9.3
SF36 MCS 3	547	46.3	10.3

When changes over time of the 519 women completing the SF-36 at all time points were explored the effect for time appeared to be significant for both the PCS mean scores ($p < 0.001$, Wilks' Lambda 0.47) and the MCS mean scores ($p = < 0.001$, Wilks' Lambda 0.75).

When the scores of the eight different domains that comprise the SF-36 were explored results showed that the mean score for 'vitality' was much lower than the other domains at each time point. 'Limitation in emotional role' was the highest at both times during pregnancy, but postnatally 'physical functioning' was the highest, with 'limitation in emotional role' next. The figures are presented in Table 10.2.

Table 10.2. SF-36 domain scores

		Role Emotional	Role Physical	Bodily pain	Vitality	General Health	Social functioning	Physical functioning	Mental health
Q1	Number	961	961	967	962	961	964	963	962
	Mean	87.86	76.08	73.23	39.41	72.92	74.81	82.88	69.58
	SD	18.72	23.166	20.63	19.33	17.94	24.17	16.77	16.77
Q2	Number	709	710	710	709	709	711	710	709
	Mean	86.27	62.26	59.30	43.86	74.92	76.87	59.77	72.56
	SD	20.14	24.36	22.08	18.74	17.61	23.55	20.42	16.12
Q3	Number	551	552	554	554	552	554	553	554
	Mean	82.91	72.89	65.97	46.10	79.22	76.32	88.00	72.50
	SD	21.74	27.87	25.31	18.79	16.48	25.09	16.87	16.33

10.2 Physical and mental wellbeing and parity

Independent samples t-tests showed that there were no statistically significant differences in the mean PCS scores of primiparous and multiparous women in early pregnancy, but there was a small significant difference in the PCS scores at 34 weeks ($p = 0.03$, 95% CI 0.12 to 2.61), with multiparous women having a mean score of 1.4 less than primiparous women. The magnitude of difference however was very small (eta squared = 0.006). Postpartum, primiparous women appeared to feel less well physically, with their mean PCS 3 scores being 2.5 less than multiparous women ($p < 0.001$, 95% CI -3.93 to -1.04). Again the effect was small (eta squared = 0.002).

There was a small significant difference in the mean MCS scores at 13 weeks ($p = 0.03$, 95% CI -2.58 to -0.16) with primiparous women scoring 1.4 less than multiparous women. The effect size was very small (eta squared = 0.005). There was no significant difference between the scores of primiparous and multiparous women in later pregnancy. Postpartum, primiparous women again appeared to feel less well mentally than multiparous women, with small statistically significant differences in their mean MCS scores of 1.9 less ($p = 0.03$, 95% CI -3.64 to -0.18). The magnitude of difference however was very small (eta squared = 0.008).

When the individual domain scores were explored in early pregnancy a significant difference in scores was found in 'social functioning' ($p = 0.002$, 95% CI -7.85 to – 1.75) and 'mental health' ($p = 0.032$, 95% CI -4.45 to -0.20), with primiparous women having lower scores in each domain. In late pregnancy there were significant differences in 'bodily pain' ($p <0.001$, 95% CI 3.28 to 9.73) and 'vitality' ($p = 0.006$, 95% CI 1.13 to 6.66) with multiparous women having lower scores than primiparous women. Postpartum primiparous women had significantly lower scores than multiparous women in the domains of 'limitation in physical role' ($p = 0.006$, 95% CI -11.23 to -1.90), 'bodily pain' ($p <0.001$, 95% CI -14.52 to -6.21), 'vitality' ($p = 0.04$, 95% CI -6.47 to -0.17), 'social functioning' (p =

<0. 001, 95% CI -13.42 to -5.10), 'physical functioning' (p = 0.002, 95% CI - 7.44 to – 1.77) and 'mental health' (p = 0.03, 95% CI -5.80 to -0.34).

10.3 Physical and mental wellbeing and age

One way between groups ANOVA was conducted to explore the impact of age on mean PCS and MCS scores. Results showed that the only statistically significant difference that age made was to mean MCS scores at both stages antenatally (p = 0.01 and <0.001) when the scores of younger women were lower than those of older women in the study . Post hoc comparisons using the Tukey HSD test indicated that the mean MCS 1 score for the 20 to 24 group (m 43.30, SD 8.96, 95% CI 41.63 to 44.96) was significantly lower than the 35 and over group (m 47.09, SD 9.06, 95% CI 45.91 to 48.27) in early pregnancy. The other age groups did not differ significantly. In late pregnancy the mean MCS 2 scores of the 19 and under age group (m 43.53, SD 11.41, 95% CI 39.01 to 48.04) were significantly lower than those of the 20 to 24 group (m 47.45, SD 8.77, 95% CI 45.36 to 49.54) the 25 to 29 group (m 49.99, SD 9.13, 95% CI 48.67 to 51.32), the 30 to 34 group (m 49.94, SD 9.44, 95% CI 48.70 to 51.18) and the 35 and over group (m 52.71, SD 8.50, 95% CI 51.49 to 53.94).

10.4 Physical and mental wellbeing and physical health

Independent samples t-tests were undertaken to determine if the mean PCS and MCS scores differed in women receiving treatment from their GP for physical health problems and those who were not. Those women who reported in Q1 that they were receiving treatment for a physical condition had lower mean PCS scores at all three time points (m = 45.87, SD 8.21, p <0.001 at Q1, m = 38.11, SD 9.17, p <0.001 at Q2, m = 48.28, SD 9.97, p = 0.04). There were no significant differences in their MCS scores.

Women who reported in Q2 that they had received treatment from their GP for a physical condition during pregnancy and women who had been admitted to hospital during pregnancy had significantly lower scores on the PCS in late pregnancy (m = 39.89, SD 9.01, p <0.001 and m = 39.15, SD 8.85, p <0.001), but not postpartum. There were no significant differences in mean MCS scores between those women and those not experiencing any problems.

10.5 Physical and mental wellbeing and psychological health

Women being treated by their GP for a psychological health problem at the time of completing Q1 had statistically significant lower mean MCS scores at 13 weeks gestation (m = 37.15, SD 10.15, p <0.001) and at 34 weeks gestation (m = 41.90, SD 11.78, p <0.001). Postnatal mean MCS scores did not differ significantly from those women not receiving treatment however. Those women who had been treated by a psychiatrist in the past also had significantly lower mean MCS scores at 13 weeks gestation (m = 41.11, SD 11.84, p < 0.001) and 34 weeks gestation (m = 47.30, SD 10.53, p < 0.001). Again there were no statistically significant differences in their mean MCS scores postpartum. There were no statistically significant differences in the mean PCS scores at any time point for those women being treated for a current psychological condition. However, those women with a past history of psychiatric treatment had significantly lower PCS scores at 34 weeks gestation (m = 39.98, SD 9.43, p = 0.04).

At both time points antenatally those women who had received treatment for depression from their GP in the past had statistically significant lower MCS (p <0.001 at Q1 and Q2) and PCS scores (p = 0.02 at Q1 and <0.001 at Q2). Postnatally their mean MCS scores were significantly lower (p <0.001) but there was no statistically significant difference in their PCS scores. Women who had received treatment from their GP for anxiety had statistically significant lower MCS scores antenatally (p <0.001 and 0.014) but there was no statistically

significant difference between the postnatal MCS scores and the PCS scores at each time point in women who had been treated for depression and those who had not.

Women who reported a history of postnatal depression in previous pregnancies had statistically significantly lower mean MCS scores at each time point than women who did not have a history of postnatal depression($p < 0.001$, < 0.001 and 0.005) indicating poorer mental wellbeing. In contrast mean PCS scores did not differ significantly in early pregnancy and postpartum for this group. In late pregnancy, however, these women had significantly lower mean PCS scores ($p = 0.008$), indicating poor physical wellbeing at this stage of their pregnancy.

Women with a family history of depression ($n = 338$) had statistically significantly lower mean MCS scores at each time point ($p < 0.001$, 0.001, 0.005) than those women without any family history. Their mean PCS score was significantly lower in late pregnancy ($p = 0.01$) but there was no significant difference between their scores and those of women with no family history of depression in early pregnancy or postpartum.

10.6 Physical and mental wellbeing of women with and without a partner

The mean PCS and MCS scores of women who reported in Q1 that they had or had not got a partner were explored. An independent samples t-test showed that mean MCS scores for those women without a partner ($n = 19$) were significantly lower than those with a partner in early pregnancy ($p = 0.14$, 95% CI 1.10 to 9.91) and also for the 9 women who remained in the study in late pregnancy ($p = 0.04$, 95% CI 0.34 to 12.59), although the magnitude of difference was very small (eta squared = 0.006 at each time point). There were no significant differences in the mean PCS scores at any point.

Summary

The chapter has presented the mean scores for the PCS and MCS of the SF-36 together with the mean scores for the individual sub-scales. Changes in the PCS and MCS scores over time have also been explored and found to be significant.

The chapter also examined the relationship between a number of demographic variables and PCS and MCS scores and demonstrated that, although the magnitude of difference was small, parity made a difference to both PCS and MCS scores at different time points. Multiparous women appeared less physically well than primiparous women in late pregnancy and primiparous women less physically well than multiparous women postnatally. Primiparous women were less mentally well at each stage in pregnancy and postpartum than multiparous women.

The findings presented in this chapter have also demonstrated that although age made no significant difference to PCS scores at any time, women in the younger age groups had significantly lower MCS scores at both stages in pregnancy indicating that their mental wellbeing in pregnancy was not as good as that of older women. Postnatally however age made no significant difference to mental wellbeing.

The chapter also reported on the relationship between current and past physical and mental history and the PCS and MCS scores showing that poorer physical health, as indicated by treatment from a GP in early or late pregnancy or admission to hospital indicated lower scores on the PCS during pregnancy, although MCS scores were not affected. Mental health problems, as indicated by a past history of depression, anxiety or postnatal depression resulted in lower scores on the MCS at both stages of pregnancy, and for those with previous postnatal depression MCS scores postpartum were also low. Women with a family history of depression also had lower MCS scores at all stages of measurements. Interesting to note, women with a past personal history of

depression, postnatal depression or psychiatric treatment also had lower PCS scores during pregnancy.

Finally the chapter reported on the relationship between women's partnerships and mean PCS and MCS scores. It showed that the presence or absence of a partner or the state of the relationship with a partner made no significant difference to mean PCS scores. However women with either no partner or a poor relationship with their partner scored significantly lower on the MCS scale at both stages in pregnancy, but there was no difference in their scores postpartum.

11. THE SELF-ESTEEM OF WOMEN

Introduction to chapter

This chapter presents the self-esteem of the participants as measured on the Rosenberg Self-Esteem measurement scale. Higher scores indicate better self esteem. Using one way repeated measures analysis of variance (ANOVA) it compares the effect that time had on each of the measures. It also presents the findings of independent samples t-tests and one-way between groups ANOVA which were performed to explore any relationships between these factors and demographic variables such as age, parity, current physical and psychological health and partnerships.

11.1 Self-esteem over time

The mean scores at each time point are shown on Table 11.1. They indicate that those women completing Q3 appeared to have higher self-esteem than those women completing Q2 and those completing Q1. One way repeated measures ANOVA was performed to determine whether the changes over time were significant. Results showed that the effect for time for the 519 women completing the RSE at each time point was not significant ($p = 0.61$).

Table 11.1. Mean RSE scores in early and late pregnancy and postpartum

Self esteem	Number	Missing	Mean	Std. Deviation
RSE 1 total	964	10	21.9	5.0
RSE 2 total	709	265	22.2	5.1
RSE 3 total	553	421	22.6	5.0

11.2 Self-esteem and parity

When the influence of parity on women's self-esteem were explored, using an independent samples t-test, no significant differences were found between the mean RSE scores of primiparous and multiparous women in early pregnancy and at postpartum follow-up. However, in late pregnancy the mean RSE scores of primiparous women were 0.9 lower than multiparous women indicating they had lower self-esteem at this stage of their pregnancy than multiparous women. This was statistically significant ($p = 0.03$).

11.3 Self-esteem and age

One way between groups ANOVA showed that age made statistically significant differences at the $p<0.05$ level in the mean RSE scores at both stages in pregnancy but not postpartum. The 35 and over age group tended to score the highest and there were significant differences ($p <0.001$) between them and all except the 30 to 34 group. Post hoc comparisons using the Tukey HSD test indicated that in early pregnancy the mean score of the 35 and over age group ($m = 23.04$, SD 5.13) was significantly higher than the lowest scoring 19 and below age group ($m = 20.12$, SD 4.77) and the mean difference was 2.92 ($p = 0.002$, 95% CI 0.8 to 5.04) In late pregnancy, again there were significant differences between the highest scoring 35 and over group and all others except the 30 to 34s ($p <0.001$). The mean difference between the 35 and overage group and the lowest scoring group, the 19 and under age group was 3.83 ($p = 0.002$, 95% CI 0.97 to 6.69). Postnatally there were no significant differences in scores.

11.4 Self-esteem and physical health

Independent samples t-tests showed that women who reported in Q1 that they were receiving treatment from their GP for a physical health problem at the time

of completing the questionnaire had statistically significantly lower self-esteem in late pregnancy with a mean difference of 1.32 (p = 0.02, 95% CI 0.24 to 2.40), but not at any other stage.

Women who reported in Q2 that they had been admitted to hospital during pregnancy had statistically significantly lower mean RSE scores in late pregnancy than those who had not (mean difference 1.2, p = 0.31, 95% CI – 2.33 to -0.11). Postnatally there was no difference in scores. Treatment from a GP during pregnancy did not make any significant difference to mean RSE scores.

11.5 Self-esteem and mental health

Women receiving treatment from their GP for a current psychological health problem at Q1 had statistically significantly lower scores at each stage of follow-up with a mean difference of 7.23 (p <0.001, 95% CI 5.57 to 8.89) at Q1, 5.51 (p <0.001, 95% CI 3.25 to 7.77) at Q2 and 4.87 (p <0.001, 95% CI 2.21 to 7.53).

Women reporting a past history of depression for which they received treatment from their GP had statistically significantly lower RSE scores at each time point than those without a past history, with a mean difference of 4.0 (p <0.001, 95%CI 3.28 to 4.72) at Q1, 4.48 (p <0.001, 95% CI 3.51 to 4.45) at Q2 and 4.83 (p <0.001, 95% CI 3.69 to 5.98) at Q3. Those women reporting a history of treatment for anxiety from their GP also had statistically significant differences in their mean RSE scores at each time point, with their scores being 2.95 lower (p <0.001, 95% CI 2.01 to 3.89) at Q1, 2.38 lower (p <0.001, 95% CI 1.24 to 3.52) at Q2 and 2.65 lower (p <0.001, 95% CI 1.30 to 4.0) at Q3 than women who did not receive treatment for anxiety. Women reporting a history of psychiatric treatment in the past had significantly lower mean RSE scores at each time point than those without a history of treatment, the differences being 3.96 in early pregnancy (p = <0.001, 95% CI 2.56 to 5.35), 2.86 in late pregnancy (p <0.001, 95% CI 1.49 to 2.43) and 3.56 postpartum (p <0.001, 95% CI 2.00 to 5.13).

Mean RSE scores for women who had a previous history of postnatal depression were also significantly lower at each time point than those without a history of postnatal depression ($p < 0.001$), with a mean difference of 3.92 (95% CI -5.43 to -2.41) between those with a history of postnatal depression and those without in Q1, 4.15 (95% CI -6.07 to -2.24) on Q2 and 4.32 (95% CI -6.24 to -2.40) on Q3.

Women reporting a family history of depression (n = 338) also had significantly lower mean RSE scores at each time point than those women without any family history of depression, although the differences were less. At Q1 the mean difference was 1.67 ($p < 0.001$, CI 1.02 to 2.33) at Q2 it was 1.80 ($p < 0.001$, CI 1.00 to 2.59) and at Q3 it was 1.79 ($p < 0.001$, CI 0.91 to 2.67).

11.6 Self-esteem of women without a partner

An independent samples t-test showed that women who reported in Q1 that they did not have a partner had significantly lower self-esteem at both points during pregnancy. The mean difference in early pregnancy was 4.86 ($p < 0.001$, 95% CI 2.60 to 7.11) and in late pregnancy was 3.96 ($p = 0.002$, 95% CI 0.58 to 7.35). Postpartum RSE scores were not significantly different.

Summary

This chapter presented the mean scores of the RSE and showed that although the mean scores increased (in other words self–esteem is better) at each time point the differences in mean scores over time are not significant.

The chapter also reported on the exploration into the differences in RSE scores depending on a number of demographic variables. It showed that parity made no significant difference to mean RSE scores in early pregnancy and postpartum, although in late pregnancy the mean scores of primiparous women were

significantly lower. Age made a significant difference to mean RSE scores at both stages during pregnancy but not in the postnatal period, with the 35 and over age group having better self-esteem.

Results of the relationship between physical and mental health and self-esteem scores have also been presented. They showed that women experiencing physical ill-health at the beginning of pregnancy had significantly lower RSE scores in late pregnancy, although it did not affect early pregnancy and postpartum scores. Treatment from a GP during pregnancy did not appear to affect women's self-esteem, although admission to hospital resulted in significantly higher RSE scores in late pregnancy, but not postpartum. Women reporting current treatment for a psychological disorder, a past history of treatment for depression or anxiety from the GP, psychiatric treatment in the past, a history of postnatal depression in previous pregnancies or a family history of psychiatric disorders had significantly lower mean RSE scores at each of the three time points.

Finally the chapter reported on the effects that having a partner and partner relationships had on self-esteem. Results showed that those women who did not have a partner and those women who had poor relationships with their partner had statistically significantly lower mean RSE scores in early and late pregnancy. Postnatally the absence of a partner or relationship with a partner did not appear to affect self-esteem.

12. CORRELATIONS BETWEEN EMOTIONAL PROCESSING AND DEPRESSION POSTPARTUM

Introduction to chapter

One hypothesis of the study was that there would be significant correlations between women's emotional processing in early pregnancy (as measured on the EPS 1) and their postnatal depression scores (as measured on the EPDS 3). This chapter explores those correlations and also examines relationships between antenatal depression, physical and mental wellbeing and self-esteem (as measured on the remaining measurement scales) and the EPDS 3.

12.1 Correlation between EPS and EPDS scores at each time point

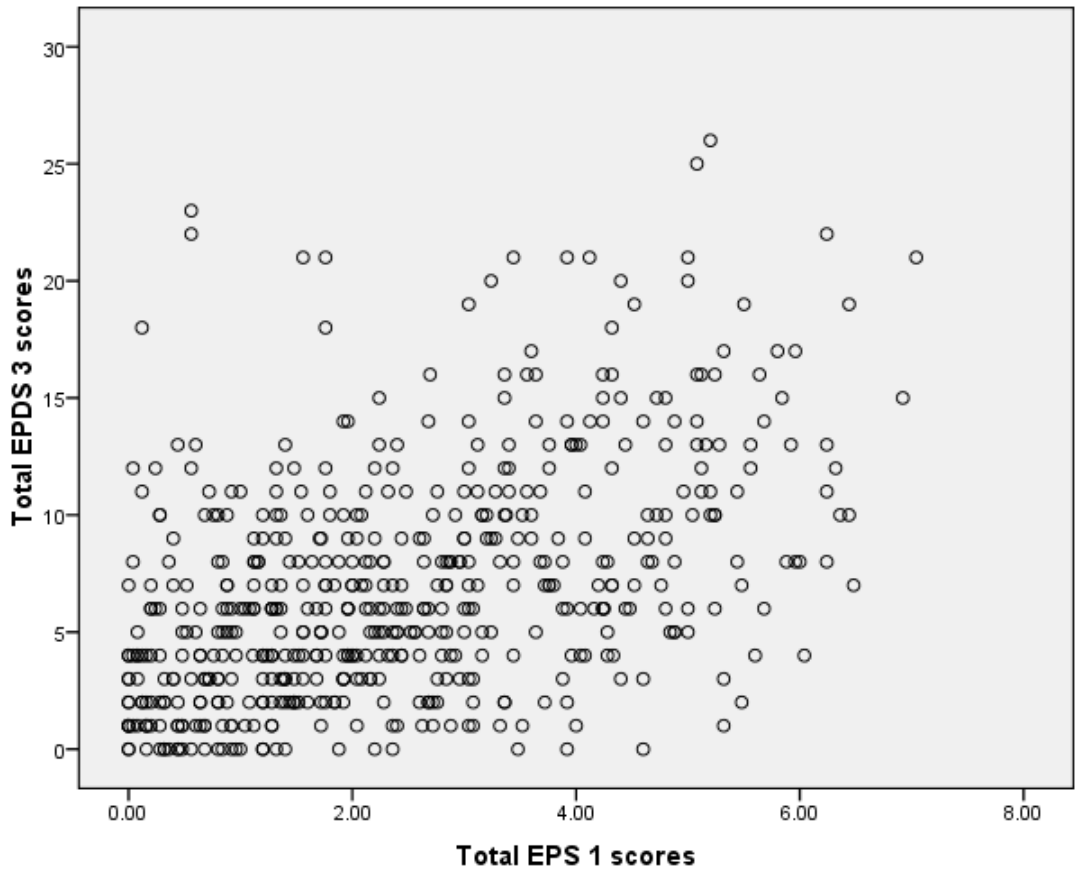
Pearson's product moment correlation co-efficient was used to explore the relationship between emotional processing (as measured on the EPS 1, 2 and 3) and the likelihood of depression (as measured on the EPDS 1, 2 and 3) in early and late pregnancy and postpartum. Using Cohen's classification of the effect size of correlation co-efficients (Cohen 1988) there were high positive correlations between the EPS 1 and the EPDS 1 ($r = 0.79$, $n = 965$, $p < 0.001$), the EPS 2 and the EPDS 2 ($r = 0.81$, $n = 708$, $p < 0.001$) and the EPS 3 and the EPDS 3 ($r = 0.82$, $n = 553$, $p < 0.001$).

12.2 Correlation between emotional processing in pregnancy and postnatal depression scores

The relationship between emotional processing in early pregnancy and the likelihood of depression postnatally was investigated using Pearson's product moment correlation coefficient. The test found that there was a positive

correlation between EPS 1 scores measured at 13 weeks antepartum and EPDS 3 scores measured at six weeks postpartum (n = 544, r = 0.47, p <0.001), with high EPS scores (indicative of difficulty in processing emotions) associated with high EPDS scores (indicating the likelihood of depression). Figure 6 illustrates the correlation.

Figure 5. Correlation between EPS 1 and EPDS 3 scores



Using Cohen's classification (Cohen 1988) the strength of this correlation can be interpreted as medium. The co-efficient of determination was calculated as 0.22 (r^2), showing that emotional processing at 13 weeks accounts for 22% of the variance in the EPDS 3 scores.

Tests identified in Chapter 8 indicated that the data were not normally distributed. Therefore to confirm the findings of Pearson's product moment

correlation, which is undertaken with parametric data, the non-parametric alternative, Spearman's rank order correlation, was also used to calculate the strength of the relationship. This test produced the same results ($r = 0.48$, $p < 0.001$) indicating that the results are robust.

Further analysis was undertaken on the sample of 525 women who provided scores for the EPS 2 and the EPDS 3 to investigate correlations between emotional processing in late pregnancy and the likelihood of depression. Again using Cohen's classification (Cohen 1988) , Pearson's product moment correlation co-efficient showed a strong positive correlation between emotional processing scores at 34 weeks antepartum (EPS 2) and EPDS 3 scores ($r = 0.5$, $p < 0.001$). Spearman's rank order correlation confirmed this finding. Twenty five percent of the variance in EPDS 3 scores was accounted for by emotional processing in late pregnancy.

12.3 Correlation between depression scores in pregnancy and postnatal depression scores

Correlations between depression experienced by women in early pregnancy (as measured on the EPDS 1) and depression experienced postpartum (as measured on the EPDS 3) were investigated. Pearson's product moment correlation co-efficient showed a strong correlation of 0.5 ($p < 0.001$, $n = 547$). This was confirmed by Spearman's rank order co-efficient. In late pregnancy the correlation was again strong ($r = 0.6$, $p < 0.001$, $n = 526$).

12.4 Correlation between physical and mental wellbeing in pregnancy and postnatal depression scores

An exploration of the correlation between women's general physical health (PCS 1) and scores on the EPDS 3 found a small negative correlation ($r = -0.2$, $p < 0.001$, $n = 539$) , significant at the 0.05 level. This was identified using both Pearson's

product moment correlation co-efficient and Spearman's rank order co-efficient, indicating that as a women's physical health deteriorates her likelihood of developing depression increases. There was a medium negative correlation between MCS 1 scores and EPDS 3 scores ($r = -0.4$, $p < 0.001$, $n = 539$), significant at the 0.02 level, indicating that as a woman's mental wellbeing decreases the likelihood of her becoming depressed postpartum is greater.

At 34 weeks gestation there was again a small negative correlation between PCS 2 scores and EPDS 3 scores ($r = -0.2$, $p < 0.001$, $n = 553$) and a medium to large negative correlation between MCS 2 scores and the EPDS 3 ($r = 0.47$, $p < 0.001$, $n = 553$). Both were significant at the 0.02 level. Postpartum there was a small negative correlation between mean PCS 3 scores and EPDS 3 scores ($r = -0.20$, $p < 0.001$, $n = 553$) and a high negative correlation between mean MCS 3 scores and EPDS 3 scores ($r = -0.80$, $p < 0.001$, $n = 553$).

12.5 Correlation between self-esteem in pregnancy and postnatal depression scores

Parametric and non-parametric tests showed a significant medium negative correlation between women's level of self-esteem in early pregnancy (RSE 1) and the development of depression postpartum (EPDS 3) ($r = -0.4$, $p < 0.001$, $n = 546$). In later pregnancy there was a significant medium to strong negative correlation (Pearson's product moment correlation co-efficient $r = -0.5$, $p < 0.001$, Spearman's rank order correlation $r = -0.4$, $p < 0.001$). These results indicate that as a women's self-esteem declines her likelihood of developing postnatal depression increases.

Summary

This chapter has explored correlations between scores on the measurement scales and EPDS 3 scores. It has shown that women with poorer ability to

process their emotions, poorer physical and mental health, and lower self esteem tend to have higher postnatal depression scores.

13. EMOTIONAL PROCESSING AND OTHER SCORES IN WOMEN WHO DID AND DID NOT DEVELOP POSTNATAL DEPRESSION

Introduction to chapter

The study hypothesised that there would be a significant difference in the mean EPS scores at 13 weeks antenatally between women who did and women who did not subsequently develop postnatal depression. For ease of reading the chapter describes women with high EPDS 3 scores as suffering from postnatal depression and those with low scores as not depressed, although it is recognised that the EPDS is not a diagnostic tool but a screening measure, and as such high scores are only indicative of a likelihood that depression is present. The chapter presents findings from independent samples t-tests which explored the mean scores antenatally of all the measurement scales for women who did and did not have high scores on the EPDS 3.

13.1 Comparison of emotional processing in pregnancy between women who did and did not develop postnatal depression.

Comparisons of the mean antenatal EPS scores between those women who subsequently displayed postnatal depression and those who did not were made using independent samples t-tests. EPDS 3 scores were dichotomized into high (scores of 13 and over) and low (scores of 12 and below).

Of the 544 women who completed the EPS 1 and the EPDS 3, 468 women (86%) scored 12 and below on the EPDS 3 and 76 women (14%) scored 13 or more. Table 13.1 illustrates a difference of 1.8 (95% CI 1.4 to 2.2) in mean EPS scores at 13 weeks between those women scoring 12 and below on the EPDS and those scoring 13 and above. This was significant ($t - 9.5$, $p < 0.001$).

As seen earlier, the Kolmogorov-Smirnov test for normality was significant ($p < 0.001$). The sample was however considered large enough not to cause any major problems but as a precaution findings were checked by using the non-parametric Mann-Whitney U test. The test showed that there was a statistically significant difference between the emotional processing of those women likely to have postnatal depression and those without ($z = 8.2$, $p < 0.001$).

At 34 weeks gestation 13.7% of women who completed the EPS 2 and the EPDS 3 (n=72) had EPDS 3 scores of 13 and above. There was a mean difference of 2.2 in EPS 2 scores between those scoring high and low on the EPDS 3 (Table 13.1). The Mann-Whitney U test also showed statistically significant differences between the emotional processing in late pregnancy of those women with high and low EPDS 3 scores ($z = 8.6$, $p < 0.001$).

Table 13.1. Mean differences in EPS 1 and 2 scores between women with high and low EPDS 3 scores

	EPDS 3 high and low scores		Levene's Test for Equality of Variances		t-test for Equality of Means					
									95% C.I.	
	≤12	≥13	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Total EPS 1	468	76	0.03	0.9	-9.5	542	<0.001	-1.8	-2.2	-1.4
Total EPS 2	453	72	1.1	0.3	-10.6	523	<0.001	-2.2	-2.6	-1.8

In order to determine whether the differences in EPS scores between those who subsequently scored high and those who subsequently scored low on the EPDS 3 changed with time repeated measures ANOVA was undertaken. Results showed there was a significant interaction effect between the time point (i.e. 2 points antenatally) and high/low scores on the EPDS 3 (Wilks' Lambda = .903, $p < 0.001$) (i.e. the difference between the EPS scores in late pregnancy was higher than the early antenatal difference). The effect size was large (partial eta squared = 0.97).

The effect for time was also significant (Wilks' Lambda = .96, p <0.001) and this effect was moderate (partial eta squared 0.04). The main effect for the group (high or low EPDS scores) was also significant (p <0.001 and this effect was large (partial eta squared = .31).

13.2 Comparison of depression measured in pregnancy between women who did and did not develop postnatal depression.

Differences in the antepartum EPDS scores of those women who subsequently scored high or low on the EPDS 3 were sought. Five hundred and forty seven women completed the EPDS 1 and 3. The mean antenatal score of the 77 women (14%) who scored 13 and above postnatally was 11.6 (SD 5.6) and of the 470 who had low EPDS 3 scores was 6.5 (SD 4.7). The mean difference between the early EPDS scores of those who subsequently developed postnatal depression and those who did not was -5. 3 (p <0.001, 95% CI 4 to 6.7).

At 34 weeks gestation the 73 women who subsequently had high EPDS 3 scores had a mean score of 12.7 (SD 5.9) and the mean score of the remaining 453 women with low scores postnatally was 6.1 (SD 4.5). The mean difference in depression scores (EPDS 2) was 6.6 (p <0.001, 95% CI 5.2 to 8).

13.3 Comparison of physical and mental wellbeing in pregnancy between women who did and did not develop postnatal depression.

Seventy five women completing the SF-36 in early pregnancy had EPDS 3 scores indicating postnatal depression and 464 women had low scores. There was a mean difference of 3.5 between the PCS scores of women who had postnatal depression and those who did not (p <0.001, 95% CI 1.8 to 5.2) and a mean difference of 7.5 in the MCS scores (p <0.001, 95% CI 5 to 10).

At 34 weeks antepartum there was the same mean difference of 3.5 in the mean PCS score of the 72 women who had depression and the 448 who did (p <0.001 95% CI 1.5 to 5.6,). There was a mean difference of 10.4 in the MCS scores (p <0.001, 95% CI 7.4 to 13.3).

The interaction effect between the time that the PCS was measured and high and low scores on the EPDS 3 was not statistically significant (p = 0.91), although there was a statistically significant effect for time (Wilks' Lambda .66, p <0.001), and this effect was large (eta squared = 0.34). The between subjects effect for the high and low EPDS scores and PCS scores was statistically significant meaning that there was a significant difference in the PCS scores at 34 weeks in women who scored high and low on the EPDS 3 (p <0.001). The effect size was moderate (partial eta squared = 0.05).

When the interaction effect between the time the MCS was measured and high and low scores were examined results showed that this was statistically significant (Wilks' lambda .86, p <0.001) and the effect size was large (partial eta squared = 0.14). The main effect for time was also statistically significant (Wilks' Lambda = .76, p <0.001) and the effect size was again large (partial eta squared = 0.24). The between subjects effect was also statistically significant and this effect was large (p <0.001, partial eta squared = O.28).

13.4 Comparison of self-esteem in pregnancy between women who did and did not develop postnatal depression.

Seventy seven women completing the RSE in early pregnancy had high scores on the EPDS 3 while 469 had low scores. There was a significant difference in their mean RSE score of 4 (95% CI 2.9 to 5.1, p <0.001). In late pregnancy there was a greater significant difference of 5 (95% CI 3.8 to 6.2, p <0.001) between the mean scores of the 73 women who had high scores and the 453 women who had low score on the EPDS 3.

Summary

This chapter has explored differences in the emotional processing, depression, physical and mental wellbeing and self-esteem scores of women who subsequently had high scores on the EPDS postpartum, indicating a likelihood of depression and those who did not.

It has demonstrated that there were significant differences in the emotional processing, depression scores, physical and metal health and self-esteem (as measured on the EPS, EPDS, PCS, MCS and RSE) in early and late pregnancy in those women who scored 13 and above on the EPDS 3 indicating the likelihood of depression and those who scored 12 and below indicating the absence of depression.

14. VARIABLES INDEPENDENTLY ASSOCIATED WITH POSTNATAL DEPRESSION

Introduction to chapter

One aim of the study was to determine which variables, as measured by scores on the measurement scales and demographic data, had the most influence on EPDS 3 scores, higher scores suggesting postnatal depression. Having explored earlier correlations between a number of variables and postnatal depression scores as identified on the EPDS 3, this chapter seeks to identify which variables are independently associated with those depression scores. Multiple regression analysis was used to explore this and to investigate how well each of the five sub-scales of the EPS predicted postnatal depression scores.

The chapter presents the regression models built. The first model explores how well emotional processing, physical and mental wellbeing and self –esteem in early pregnancy (as assessed by the EPS, the PCS and MCS of the SF-36 and the RSE) predict postnatal depression (as assessed by the EPDS 3). A second model includes all the variables identified in earlier meta-analyses as high, moderate and low risk factors for postnatal depression together with the EPS 1 to determine how strong the EPS is in predicting scores on the EPDS 3 after adjusting for other known risk factors. A further model explores the predictive value of the EPS 1 alongside all the variables found in the previous models to be significant in predicting depression postpartum. The chapter continues by presenting the findings from models built using the risk factors measured in late pregnancy. A statistical model indicating which factors predict increasing scores on the EPDS 3 and which are strongest is presented. Additionally there is an exploration of the sub scales of the EPS measured in early and late pregnancy in order to determine which have the most influence on the mean EPDS scores at six weeks postpartum.

14.1 The value of the early pregnancy measurement scales in predicting scores on the EPDS 3

Earlier correlation analysis identified a significant medium positive correlation (r = 0.47) between emotional processing in early pregnancy (as measured by the total score on the EPS 1) and high EPDS scores (as measured by the total score on the EPDS 3) and that emotional processing accounted for 22% of the variance in EPDS 3 scores. Following this, univariable regression analysis demonstrated that a model built with only emotional processing predicted depression scores significantly well (F = 157.3, p <0.001). The unstandardized regression co-efficient (B) was 1.42 (p <0.001, 95% CI 1.19 to 1.64) indicating that for every unit increase in emotional processing in early pregnancy (EPS1) there was an average increase of 1.4 in the EPDS 3 score.

A standard multiple regression analysis with total EPDS scores at six weeks postpartum (EPDS 3) as the dependent variable was performed, entering the measurement scales for early pregnancy as independent variables (EPS 1, EPDS 1, SF-36 PCS 1 and MCS 1, and RSE 1) in order to see how well emotional processing, depression, physical and mental wellbeing and self-esteem in early pregnancy predict the development of postnatal depression as seen by increasing mean scores on the EPDS 3. The total number of participants contributing to this analysis was 535. With all the variables entered, the R square value was 0.29 indicating that the model accounted for 29% of the variance in EPDS 3 scores (p <0.001). Multicollinearity assumptions were not violated. Table 14.1 shows that all the variables made a statistically significant contribution to the prediction of EPDS 3 scores except for the mental health component of the SF-36. However the EPDS 1 made the strongest unique contribution (standardized regression co-efficient β = 0.22, t = 3.03, p = 0.003, B = 0.21, 95% CI 0.7 to 0.34). The EPS 1 made the next greatest contribution (β= 0.2, t = 3.12, p = 0.002, B = 0.58, 95% CI 0.21 to 0.94). The findings showed that, after adjusting for the influence of other variables, including depression, for

every unit increase in emotional processing scores in early pregnancy there will be an average increase of around 0.6 in the score on the EPDS 3.

Table 14.1. EPDS 3 prediction model with early measurement scale variables

	Unstandardized Coefficients	95% Confidence Interval for B				Standardized Coefficients
Model	B	Lower Bound	Upper Bound	t	Sig.	Beta
(Constant)	11.33	6.26	16.40	4.39	.000	
EPS 1	.58	.21	.94	3.12	.002	.20
SF36 PCS 1	-.07	-.13	-.02	-2.60	.010	-.10
SF36 MCS 1	-.02	-.08	.04	-.68	.498	-.04
RSE 1	-.12	-.22	-.03	-2.53	.012	-.12
EPDS 1	.21	.07	.34	3.03	.003	.22

A further model was built entering emotional processing, physical and mental wellbeing and self-esteem measured in late pregnancy to determine which had the strongest predictive power. Table 14.2 presents the results.

Table 14.2. EPDS 3 prediction model with late pregnancy measurement scale variables

	Unstandardized Coefficients	95% Confidence Interval for B				Standardized Coefficients
Model	B	Lower Bound	Upper Bound	t	Sig.	Beta
(Constant)	15.65	11.47	19.84	7.35	.000	
EPS 2	.74	.44	1.05	4.72	.000	.27
SF36 PCS 2	-.05	-.10	-.01	-2.19	.029	-.08
SF36 MCS 2	-.10	-.15	-.04	-3.15	.002	-.18
RSE 2	-.16	-.26	-.07	-3.37	.001	-.17

The model accounted for 32% of the variance in EPDS 3 scores ($p < 0.001$). Table 14.2 shows that all the variables made a significant unique contribution to the

model, but, after controlling for these other variables, emotional processing in late pregnancy made the strongest unique contribution (β = 0.27), showing that for every unit increase in EPS scores in late pregnancy there will be an average increase of 0.7 in EPDS 3 scores (B = 0.7, t = 4.7, p <0.001, 95% CI 0.4 to 1.1).

When a further model was built adding depression scores (EPDS 2) to the model, however, (Table 14.3) the regression co-efficients of all of the variables in the previous model were nearer to 0 and they ceased to be significant, suggesting that their effect has been explained by the effect of the EPDS 2. Only depression in late pregnancy made a unique contribution to the prediction of depression postnatally (B = 0.45, t = 6.45, p <0.001, 95% CI 0.32 to 0.6, r^2 = 0.37).

Table 14.3. EPDS 3 prediction model with late pregnancy measurement scale variables plus EPDS 2

	Unstandardized Coefficients	95% Confidence Interval for B				Standardized Coefficients
Model	B	Lower Bound	Upper Bound	t	Sig.	Beta
(Constant)	5.814	.792	10.836	2.274	.023	
EPS 2	.220	-.118	.558	1.278	.202	.079
SF36 PCS 2	-.022	-.066	.022	-.986	.325	-.037
SF36 MCS 2	-.011	-.073	.052	-.339	.735	-.020
RSE 2	-.050	-.147	.047	-1.006	.315	-.052
EPDS 2	.454	.316	.593	6.450	.000	.478

14.2 The value of other identified risk factors in predicting scores on the EPDS 3

Chapter 1 identified those variables found by three large meta-analyses to be strong to medium, medium and low risk factors for postnatal depression (O'Hara and Swain 1996; Beck 2001; Robertson et al. 2004). Those variables identified as

strong to medium risk factors were depressed mood or anxiety during pregnancy, past history of depression, perceived low levels of support and life stresses.

Standard multiple regression analysis was undertaken, using the 'enter' method to add the variables representing these risk factors – current psychological condition, past referral to a psychiatrist, history of anxiety and depression, divorce, death of a loved one, house move, change of job and chronic illness experienced over the last year and practical and emotional support from partner, family and friends identified in Q1. Practical and emotional support from partner, family and friends were recoded into dichotomous variables to facilitate modelling. 532 women provided this data in early pregnancy. The model explained 11% of the variance in postnatal depression scores ($r = 0.34$, $p < 0.001$).

The model selected, in order, a history of depression ($\beta = 0.22$, $t = 4.3$, $p < 0.001$, $B = 2.75$, 95% CI 1.5 to 4.0), emotional support from partner ($\beta = 0.1$, $t = 2.1$, $p = 0.04$, $B = 2.41$, 95% CI 0.1 to 4.7) and new job ($\beta = 0.09$, $t = 2$, $p = 0.042$, $B = 1.05$, 95% CI 0.4 to 2.1) as significant predictors of EPDS 3 scores (Table 14.4). The model indicates that the mean EPDS 3 score of a woman with a past personal history of depression will be on average 2.8 points higher than a woman without a history, and the mean EPDS 3 score for a woman who does not perceive she has support emotionally from her partner will be 2.4 points higher than one who feels supported emotionally. The mean EPDS 3 scores of a woman who has changed her job will be on average one point higher than one who has remained in the same job.

Table 14.4. EPDS 3 prediction model using medium to high risk variables

	Unstandardized Coefficients	95% Confidence Interval for B				Standardized Coefficients
Model	B	Lower Bound	Upper Bound	t	Sig.	Beta
(Constant)	1.32	-2.48	5.12	.682	.496	
Current psychological condition	-.76	-3.54	2.02	-.540	.590	-.03
Psychiatrist referral	-.03	-1.77	1.71	-.037	.970	-.00
History of anxiety	.28	-1.19	1.76	.375	.708	.02
History of depression	2.75	1.50	4.01	4.307	.000	.22
Divorce	1.31	-1.77	4.40	.836	.403	.04
Death of loved one	-.11	-1.23	1.01	-.192	.848	-.01
Moved house	.45	-.51	1.41	.926	.355	.04
New job	1.05	.040	2.06	2.040	.042	.09
Chronic illness	-.06	-1.36	1.24	-.091	.927	-.00
Partner practical support	-1.53	-4.45	1.39	-1.031	.303	-.05
Partner emotion. support	2.41	.12	4.69	2.067	.039	.10
Family practical support	.05	-1.71	1.80	.051	.959	.00
Family emotion. support	.51	-1.36	2.37	.531	.596	.03
Friends practical support	1.76	-.62	4.14	1.451	.147	.09
Friends emotion. support	1.24	-1.25	3.73	.980	.328	.06

Factors identified as being medium and small risk factors for postnatal depression were low self esteem and poor marital relationship (medium), and low SES and obstetric factors (small). Self-esteem was already identified as having a predictive power in a previous regression model (Table 14.1). Women's employment status had been collected in Q1 to represent their socio-economic status. To facilitate modelling, multiple responses were re-coded into binary codes using employed and unemployed as the categories. These categories were chosen as a large number of women fell into the category of not working/student/housewife, classified as unemployed. Responses to the

question relating to relationship with partner were dichotomized into good and bad and responses to type of birth were dichotomized into normal or assisted.

Table 14.5 shows that, of all the variables making a significant contribution to the model, physical problems postnatally made the strongest unique contribution (β = 0.19, t = 4.4, p <0.001, 95% CI 1.3 to 3.3), predicting that a woman suffering from physical problems postpartum (identified in Q3 as painful perineum, infection or pain in caesarean section wound, difficulty passing urine, painful haemorrhoids, backache or fatigue) will have an average mean EPDS 3 score of 2.3 higher than a women who feels well. Similarly, a woman who does not feel satisfied with her birth experience will have a mean EPDS 3 score of 1.7 higher (β = 0.15, t = 3.3, p < 0.001, 95% CI 0.7 to 2.7) than a woman who is happy with the experience. Problems with infant feeding also made a significant contribution to the model (β = 0.13, t = 3.1 p = 0.002, 95% CI 0.5 to 2.1) with those women experiencing difficulties having a mean EPDS score of 1.3 higher than those whose babies fed well. Relationship with partner and SES did not make a significant contribution to prediction of EPDS scores. The model accounted for 11% of the variance in EPDS 3 scores (r = 0.3, p <0.001, n = 532).

Table 14.5. EPDS 3 prediction model using medium to low risk variables

	Unstandardized Coefficients	95% Confidence Interval for B				Standardized Coefficients
Model	B	Lower Bound	Upper Bound	t	Sig.	Beta
(Constant)	1.21	-4.28	6.71	.43	.664	
Relationship with partner	2.99	-2.42	8.39	1.09	.278	.05
SES	-.73	-1.73	.28	-1.42	.155	-.06
Type of birth	.01	-.29	.31	.05	.957	.00
Satisfaction with birth	1.67	.66	2.67	3.26	.001	.15
Infant feeding problems	1.31	.49	2.14	3.14	.002	.13
Physical p/n problems	2.28	1.27	3.29	4.42	.000	.19

14.3 The value of all statistically significant early pregnancy variables in predicting scores on the EPDS 3

A standard multiple regression model was built, entering the EPS measured in early pregnancy together with the risk factors found in the models above to be statistically significant predictors of EPDS 3 scores. Obstetric factors found to be significant in the previous model (physical problems postpartum, satisfaction with birth and infant feeding problems) were discounted in this subsection as the focus was on modifiable factors that could be identified in early pregnancy. Relationship with partner and SES were retained to determine how they performed within this model and age was added as it was shown in earlier analysis to be related to EPDS scores.

The model accounted for 29% of the variation in depression scores postpartum ($r = 0.29$, $p < 0.001$, $n = 493$. Table 14.6 shows that within this model, self-esteem, SES, age and a new job started within the last year were not statistically significant. Relationship with partner and emotional support from partner had a marginally significant p value. Four remaining variables made a contribution to the prediction of postnatal depression. The strongest unique significant contribution to the model was made by depression in early pregnancy as identified by scores on the EPDS 1 ($\beta = 0.21$, $t = 3.08$, $p = 0.002$, 95% CI 0.36 to 2.34), followed by emotional processing in early pregnancy ($\beta = 0.19$, $t = 3.13$, $p = 0.002$, 95% CI = 0.07 to 0.33). Following in order, the other variables making a unique contribution to the prediction of postnatal depression were a past history of depression in early pregnancy and physical wellbeing in early pregnancy. The model predicted that, after adjusting for all the other variables, for every unit increase in EPS 1 scores there will be an average increase of 0.2 in mean EPDS 3 scores ($p = 0.002$, $B = 0.6$).

Table 14.6. EPDS 3 prediction model including all significant early pregnancy variables

	Unstandardized Coefficients	95% Confidence Interval for B				Standardized Coefficients
Model	B	Lower Bound	Upper Bound	t	Sig.	Beta
(Constant)	9.052	4.86	13.24	4.24	.000	
EPS 1	.55	.17	. .92	2.89	. .004	.18
SF36 PCS 1	-.06	-.12	-.00	-.20	. .037	-.08
RSE 1	-.10	-.20	.00	-1.92	. .06	-.10
EPDS 1	.20	.07	.33	3.08	. .002	.21
History of depression	1.52	.49	2.53	2.90	. .004	.12
Relationship- partner	-1.75	-6.66	3.16	-.70	. .48	-.03
Emotional support partner	.55	-.97	2.07	.71	.476	.03
SES	-.69	-1.63	.25	-1.45	. .15	-0.57
New job	.89	-.31	1.81	1.90	. 0.58	.075
Age	.02	-.35	-39	.10	.92	.004

14.4 The value of all identified early pregnancy and birth risk factors in predicting scores on the EPDS 3

Having identified the significant early pregnancy predictors of increasing EPDS 3 scores and those variables associated with the birth experience that were significant in predicting postnatal depression, a further model to include all of those variables was built using standard multiple regression analysis and the enter method.

The model accounted for 35% of the variance in EPDS 3 scores ($r = 0.6$, $p < 0.001$, $n = 530$). Table 14.7 shows that all the variables with the exception of physical wellbeing in early pregnancy contributed significantly to the model. The standardized beta values show that, in order, depression in early pregnancy, emotional processing in early pregnancy, satisfaction with birth experience and

difficulties with feeding all made unique contributions to the model. Physical problems postnatally and a past history of depression made equal contributions. The model shows that, after adjusting for the influence of all the other significant variables for every increase of 1 unit on the EPS there will be an increase of 0.6 in mean EPDS 3 scores (B= 0.58, t = 3.3, p = 0.001, 95% CI 0.2 to 0.9).

Table 14.7. EPDS 3 prediction model including all significant early pregnancy variables and birth experiences

	Unstandardized Coefficients	95% Confidence Interval for B				Standardized Coefficients
Model	B	Lower Bound	Upper Bound	t	Sig.	Beta
(Constant)	4.01	.98	7.03	2.60	.010	
EPS 1	.58	.24	.92	3.31	.001	.20
SF36 PCS 1	-.05	-.10	.00	-1.87	.062	-.070
EPDS 1	.26	.15	.37	4.63	.000	.27
History of depression	1.26	.34	2.18	2.68	.008	.10
Happy with birth	1.61	.79	2.44	3.86	.000	.14
Feeding problems	1.32	.62	2.03	3.69	.000	.13
Physical problems p/n	1.22	.34	2.10	2.72	.007	.10

14.5 The predictive value of variables measured in late pregnancy

Earlier exploration of emotional processing identified a clinically significant increase between mean scores obtained at 13 weeks and those obtained at 34 weeks gestation. Therefore, although the aim of the study was to determine whether EPS 1 scores would predict EPDS 3 scores, an exploration of EPS 2 scores was undertaken to determine the predictive value of these.

A standard multiple regression was performed using the 'enter' method to include those variables identified as risk factors earlier, that were measured

again in late pregnancy (emotional processing, physical and mental wellbeing and self esteem), and adding practical and emotional support from partners, family and friends that were also measured in late pregnancy The model was highly significant and accounted for 33% of the variance in EPDS 3 scores (r = 0.6, p <0.001).

As Table 14.8 illustrates, in order of standardised regression coefficients the model identified emotional processing in late pregnancy, low self esteem, mental wellbeing and lack of practical support from partner as making a unique significant contribution to the prediction of EPDS 3 scores. The model illustrated that, after adjusting for the other significant factors, for every one unit increase in the EPS 2 there will be an average 0.8 increase in EPDS 3 scores (B = O.82, t = 5.12, p <0.001, 95% CI 0.5 to 1.13).

Table 14.8. EPDS 3 prediction model with late pregnancy variables

	Unstandardized Coefficients	95% Confidence Interval for B				Standardized Coefficients
Variables	B	Lower Bound	Upper Bound	t	Sig.	Beta
(Constant)	14.53	10.19	18.86	6.58	.000	
EPS 2	.82	.50	1.13	5.12	.000	.29
PCS 2	-.04	-.09	.00	-1.90	.058	-.08
MCS 2	-.08	-.14	-.02	-2.61	.009	-.15
RSE 2	-.16	-.26	-.07	-3.33	.001	-.17
Partner practical support	-2.44	-4.11	-.76	-2.86	.004	-.13
Partner emotional support	.90	-.75	2.56	1.07	.284	.05
Family practical support	-.54	-1.99	.90	-.74	.459	-.04
Family emotional support	.32	-1.29	1.91	.39	.699	.02
Friends practical support	.95	-1.17	3.06	.88	.380	.05
Friends emotional support	-.17	-2.48	2.15	-.14	.889	-.01

The same model was repeated adding depression in late pregnancy as measured by the EPDS 2. Table 14.9 shows that only practical support from a partner remained significant and the EPDS 2 made the strongest unique contribution to the prediction of depression postnatally.

Table 14.9. EPDS 3 prediction model with late pregnancy variables and EPDS 2

	Unstandardized Coefficients	95% Confidence Interval for B				Standardized Coefficients
Variables	B	Lower Bound	Upper Bound	t	Sig.	Beta
(Constant)	5.60	.59	10.60	2.198	.03	
EPS 2	.30	-.05	.638	1.70	.09	.11
PCS 2	-.02	-.06	.025	-.87	.38	-.03
MCS 2	-.01	-.07	.056	-.20	.85	-.01
RSE 2	-.06	-.15	.041	-1.13	.26	-.06
Partner practical support	-1.66	-3.05	-.257	-2.33	.02	-.08
EPDS 2	.44	.31	.581	6.31	.00	.47

Depression in late pregnancy was removed from the model and a further model was built adding life stressors measured in late pregnancy (divorce, death of a loved one, moving house, new job and chronic illness). All the significant variables from the previous late pregnancy model continued to be significant making a unique contribution in the same order. Undertaking a new job and moving house in late pregnancy were also significant (p = 0.03 for both). Receiving treatment from the GP and admission to hospital during pregnancy were also added to the model, however these did not make a significant contribution.

When a further model was built adding a past history of depression to the previous model (being the only other significant early pregnancy predictor that

was not measured again in late pregnancy) emotional processing continued to make the strongest unique contribution (β = 0.29, t = 5.08, p <0.001, 95% CI 0.5 to 1.13), but past history of depression made the next strongest unique contribution (β = 0.09, t = 2.29, p = 0.02, 95% CI 0.16 to 2.15). All the other variables continued to make a significant contribution to the prediction of postnatal depression.

14.6 The predictive value of the EPS sub-scales in identifying scores on the EPDS 3

Having established that emotional processing is a predictor of postnatal depression a standard multiple regression analysis was undertaken to determine which of the individual sub-scales of the EPS best predicted depression. A regression model was built using the 'enter' method (Table 14.10).

Table 14.10. Model using EPS 1 sub-scales to predict EPDS 3 scores

	Unstandardized Coefficients	95% Confidence Interval for B				Standardized Coefficients
EPS 1 sub-scales	B	Lower Bound	Upper Bound	t	Sig.	Beta
(Constant)	3.47	2.78	4.16	9.88	.000	
Suppression	.32	.03	.61	2.16	.031	.13
Unregulated emotions	.44	.12	.75	2.71	.007	.17
Impoverished emotions	.12	-.27	.51	.61	.540	.04
Unprocessed emotions	.29	-.02	.60	1.87	.063	.13
Avoidance	.23	-.09	.55	1.40	.162	.08

'Suppression' and 'unregulated emotions' in early pregnancy were the only sub-scale variables to make a statistically significant contribution to the prediction of EPDS 3 scores. 'Unregulated emotions' made the strongest unique contribution (β = 0.17, t = 2.7, p = 0.007, 95% CI 0.1 to 0.8). The model was repeated using 'backward stepping', in which the SPSS programme places all the predictors in

the model and then calculates the contribution of each one by looking at the significance value of the t statistic and removing any variables which do not make a contribution to the model. This confirmed 'unregulated emotions' as the strongest sub-scale predictor in early pregnancy (B = 0.6, t = 3.1, p = 0.001, 95% CI 0.2 to 1.0). 'Suppression' remained significant, but none of the other subscales were statistically significant.

When the model was built again using the sub-scales measured in late pregnancy, as Table 14.11 demonstrates, 'unregulated emotions' again made a significantly unique contribution to the prediction of postnatal depression (β = 0.18, t = 2.6, p = 0.009, B = 0.5, 95% CI 0.1 to 8.2). 'Suppression of emotions' no longer made a significant contribution, however, and the strongest contribution was made by 'unprocessed emotions' (β = 0.22, t = 2.9, p = 0.003, B = 0.5, 95% CI 0.2 to 0.8).

Table 14.11. Model using EPDS 2 sub-scales to predict EPDS 3 scores

	Unstandardized Coefficients	95% Confidence Interval for B				Standardized Coefficients
EPS 2 sub-scales	B	Lower Bound	Upper Bound	t	Sig.	Beta
(Constant)	3.29	2.61	3.96	9.54	.000	
Suppression	.15	-.13	.44	1.05	.293	.07
Unregulated emotions	.47	.12	.82	2.63	.009	.18
Impoverished emotions	.16	-.24	.56	.79	.431	.06
Unprocessed emotions	.49	.16	.83	2.93	.003	.22
Avoidance	.12	-.16	.41	.85	.395	.05

Summary

This chapter has presented the findings from multiple regression analysis undertaken to explore which variables, particularly emotional processing, best predict postnatal depression, as identified by higher mean scores on the EPS3.

Regression models built to explore the predictive power of emotional processing, physical and mental wellbeing, self-esteem and depression showed that each made a unique contribution to the prediction of postnatal depression in both early and late pregnancy, and when placed in order of significance, emotional processing in early pregnancy made the second strongest unique contribution to the prediction of depression next to early antenatal depression. The association between emotional processing and postnatal depression scores was independent of the other risk factors identified in the literature.

Regression models built with variables identified by meta-analyses as being high, medium and small risk factors for postnatal depression concurred in general with the literature. This will be discussed in more detail in a later chapter. The chapter also explored the contribution that each of the EPS sub-scales made to the prediction of postnatal depression and identified that 'unregulated emotions' and 'suppression of emotions' made a unique contribution in early pregnancy whereas, while 'unregulated emotions' remained significant in late pregnancy, 'unprocessed emotions' became the strongest predictor of depression postpartum.

15. PREDICTION OF POSTNATAL DEPRESSION

Introduction to chapter

The study sought to build statistical models using previously identified risk factors for postnatal depression alongside emotional processing in order to determine which factors best predict depression postpartum. Having constructed models to determine which variables predict scores on the EPDS 3, this chapter explores further which variables will predict postnatal depression (as identified by scores of 13 and above on the EPDS 3). It explains how binary logistic regression was undertaken to calculate the odds ratios of a woman having postnatal depression at six weeks postpartum, given certain conditions.

The chapter begins by exploring the relationship between high and low EPS scores in early and late pregnancy (as identified by a score of 4.6 and above, and 4.5 and below, as described in Chapter 6) and high and low EPDS scores postpartum. EPS scores were dichotomised into high and low as it was considered that information gained about a subgroup of women who scored highly on the EPS and who might thus benefit from intervention, might improve the clinical utility of the results. The chapter continues by providing details of individual models built to determine the odds ratio of women with high EPS scores having high EPDS 3 scores or low EPDS 3 which would indicate the likelihood or not of postnatal depression relative to those with low EPS scores.

The chapter explains the rationale for the models built: The first model presents the odds of a woman with a high EPS score developing postnatal depression after adjusting for the other measurement scale variables; a further model explores the odds associated with the risk factors identified in the earlier multiple regression analysis as significantly predicting higher EPDS 3 scores and a further model combines all the significant early pregnancy variables into one

model to determine the odds of a woman with poor emotional processing developing postnatal depression after adjusting for other known risk factors. The chapter continues by reporting on the results of further similar models built using late pregnancy variables. A summary table of all the logistic regression analysis is then presented, indicating the sensitivity, specificity and positive predictive value of each model. Further models exploring the individual sub-scales are then presented and finally conclusions are drawn that confirm the hypothesis that a cut-off of 4.6 and above on the EPS 1 does predict a score above the threshold of 13 on the EPDS 3.

15.1 Relationship between high emotional processing scores in pregnancy and high depression scores postpartum

Emotional processing scores were dichotomized into high (4.6 and above) and low (4.5 and below). Table 15.1 shows the number of women scoring 4.6.and above and those scoring 4.5 and below in early and late pregnancy and postpartum.

Table 15.1. EPS high and low scores in pregnancy and postpartum

EPS	4.5 and below	4.6 and above	Total	Missing
	Number (%)	Number (%)	Number	Number
EPS 1 (13 weeks a/n))	791 (82)	174 (18)	965	9
EPS 2 (34 weeks a/n)	599 (84)	110 (16)	709	265
EPS 3 (6 weeks p/n)	483 (87)	70 (13)	553	421

The chi square test for independence was undertaken to determine any relation between high and low EPS scores measured in early pregnancy and high and low EPDS scores measured postnatally. Table 15.2 shows that 40% of women who had high emotional processing scores in early pregnancy (n=30) had correspondingly high scores on the EPDS postpartum, indicating probable depression, compared with 10% (n = 46) of women with low EPS scores who had correspondingly high EPDS 3 scores. This difference was statistically significant (chi square = 46.6, $p < 0.001$).

Table 15.2. Association between high and low scores in early pregnancy and high and low EPDS scores postpartum

EPS1 scores	EPDS 3 scores		
	≤12 (low) n (%)	≥13 (high) n (%)	Total n (%)
≤4.5 (low)	423 (90)	46 (10)	469 (100)
≥4.6 (high)	45 (60)	30 (40)	75 (100)
Total	468 (86)	76 (14)	544 (100)

When the test was repeated with high and low EPS scores measured in late pregnancy (EPS 2), 50% of the women who had high EPS 2 scores (n = 80) also subsequently had high EPDS 3 scores (Table 15.3). This result was significant (chi square = 101, p <0.001).

Table 15.3. Association between high and low EPS scores in late pregnancy and high and low EPDS 3 scores postpartum

EPS 2 scores	EPDS 3 scores		
	≤12 (low) n (%)	≥13 (high) n (%)	Total n (%)
≤4.5 (low)	413 (93)	32 (7)	445 (100)
≥4.6 (high)	40 (50)	40 (50)	80 (100)
Total	453 (86)	72 (14)	525 (100)

15.2 High emotional processing scores as predictors of postnatal depression.

Multiple regression analysis showed that an increase in scores on the EPS statistically significantly predicted an increase in scores on the EPDS. Developing this further, models were then built using binary logistic regression in order to determine the odds ratio of women with high EPS scores having high EPDS 3 scores (as identified by scores of 13 and above on the EPDS 3) or low EPDS 3

(scores of 12 or less) which would indicate the likelihood or not of postnatal depression relative to those with low EPS scores.

15.2.1 Early pregnancy EPS scores and measurement scale variables as predictors of postnatal depression

EPDS 3 scores were dichotomized into scores of 12 and below, indicating an absence of postnatal depression and scores of 13 and above, indicating postnatal depression. The EPS high and low scores, SF-36, PCS and MCS and RSE scores in early pregnancy were entered into a model and binary logistic regression performed using the 'enter' method. The omnibus test of model coefficients goodness of fit test was highly significant (chi square 67.68, 4df, $p < 0.001$, $n = 535$) and the Hosmer and Lemeshow goodness of fit test further supported the model (chi square = 8.48, 8df, $p = 0.39$). The pseudo R square values (Cox and Snell, Nagelkerke) showed that between 12% and 22% of the variability in the EPDS 3 was explained by the model.

Table 15.4 tabulates the observed classification of women having high or low EPDS 3 scores against their classification as predicted by the logistic regression model. In the model, women are classified as predicted to have high EPDS scores if their predicted probability is over 0.5. Overall 86.7% were correctly classified by the model. The model correctly predicted 15% of cases with high EPDS 3 scores, indicating postnatal depression (sensitivity) and 99% of cases with low scores indicating absence of depression (specificity). The positive predictive value was 57.9% indicating that of the women predicted to be likely to develop postnatal depression 57.9% had observed EPDS values of 13 or more.

Table 15.4. Classification of high and low EPDS 3 scores from early pregnancy predictors (excluding depression)

		Predicted		
		EPDS 3 high and low scores		
Observed		≤12	≥13	% Correct
EPDS 3 high and low scores	≤12	453	8	98.5
	≥13	63	11	14.9
	Overall Percentage			86.7

a. The cut value is .500

Table 15.5 shows that all the variables except mental wellbeing made a significant unique contribution to the prediction of postnatal depression, but as the EPS is on a binary scale and the others are on continuous scales it is hard to tell which variable makes the best prediction. Results indicated that the odds of a woman with high EPS scores (poor emotional processing) having postnatal depression were 2.5 times greater than a woman with low scores (Exp (B) 2.52, 95 % CI 1.25 to 5.11, p =0.01).

Table 15.5. Logistic regression model 1: Measurement scale variables in early pregnancy (excluding depression) contributing to postnatal depression

Early pregnancy measurement scale variables	B	S.E.	Wald	df	Sig.	OR (95.0% C.I).
Emotional processing high score	.93	.36	6.62	1	.010	2.52 (1.25,5.11
Physical wellbeing	-.05	.02	8.15	1	.004	0.95 (0.92,0.98)
Mental wellbeing	-.03	.02	3.19	1	.074	0.97 (0.94,1.00)
Self-esteem	-.10	.03	9.02	1	.003	0.91 (0.85,0.97)
Constant	3.85	1.18	10.70	1	.001	47.18

Results changed considerably, however, when EPDS 1 scores were added to the model. The omnibus test of model coefficients goodness of fit test was highly significant (chi square 74.94, 5df, p <0.001, n = 535) and the Hosmer and

Lemeshow goodness of fit test further supported the model (chi square = 14.61, 8df, p = 0.67). The pseudo R square values (Cox and Snell, Nagelkerke) showed that between 13% and 24% of the variability in the EPDS 3 was explained by the model.

Table 15.6 presents the number of cases correctly classified by the model (87%) and illustrates that the sensitivity was 18% and the specificity was 99%. The positive predictive value was 65%.

Table 15.6. Classification of high and low EPDS 3 scores from early pregnancy predictors (including depression)

		Predicted		
		EPDS 3 high and low scores		
Observed		≤12	≥13	% Correct
EPDS 3 high and low scores	≤12	454	7	98.5
	≥13	61	13	17.6
	Overall Percentage			87.3

a. The cut value is .500

When depression in early pregnancy (EPDS 1) was added to the model only the physical wellbeing variable continued to make a unique contribution to the model. Emotional processing failed to make a statistically significant contribution (Table 15.7), although its odds ratio remained high (around 2). The table demonstrates that, after adjusting for depression in early pregnancy, for every unit decrease in PCS scores at 13 weeks gestation (indicating poorer health) the odds of a woman having postnatal depression rise 0.96 fold (Exp (B) = 0.96, 95% CI 0.92 to 0.10, p = 0.007). After adjusting for poor physical wellbeing in early pregnancy for every unit increase on the EPDS 1 the odds of a woman having depression postnatally are increased by 1.1 (Exp (B) = 1.12, 95% CI 1.03 to 1.22, p = 0.007).

Table 15.7. Logistic regression model 2: Measurement scale variables in early pregnancy (including depression) contributing to postnatal depression

Early pregnancy measurement scale variables	B	S.E.	Wald	df	Sig.	OR (95.0% C.I).
Emotional processing high score	.66	.37	3.11	1	.078	1.93 (0.93, 4.01)
Physical wellbeing	-.05	.02	5.99	1	.015	0.96 (0.92, 0.10)
Mental wellbeing	.00	.02	.02	1	.887	1.00 (0.96, 1.04)
Depression	.12	.04	7.23	1	.007	1.12 (1.03, 1.22)
Self-esteem	-.06	.04	2.54	1	.111	0.94 (0.88, 1.01)
Constant	.37	1.75	.04	1	.834	1.44

15.2.2 Other early pregnancy variables as predictors of postnatal depression

Early pregnancy variables identified in the multiple regression analysis reported in Chapter 14 as predicting scores on the EPDS 3 (past history of depression, emotional support from partner, relationship with partner, new job and SES) were entered into a binary logistic model using the 'enter' method. Relationship with partner was dichotomized into good relationship and poor or no relationship, and employment status (SES) was dichotomized into employed and unemployed.

The model was a good fit (chi square 32.9, 5df, $p < 0.0001$, $n = 529$) as it correctly classified 86% of the cases and accounted for between 6% and 11% of the variation in EPDS scores. As illustrated in Table 15.8 the sensitivity of the model was 9% and the specificity was 98%. The positive predictive value was 46%.

Table 15.8. Classification of high and low EPDS 3 scores from categorical variables

Observed		Predicted		
		EPDS 3 high and low scores		
		12 and below	13 and above	% Correct
EPDS 3 high and low scores	12 and below	431	7	98.4
	13 and above	65	6	8.5
	Overall Percentage			85.9

a. The cut value is .500

Table 15.9 shows that only a history of depression and a negative perception of emotional support from partner made a significant contribution to the model showing that the odds of developing postnatal depression for a woman with a history of depression are 2.7 times greater than for a woman who has no history (Exp (B) = 2.70, 95% CI 1.5 to 4.9, p = 0.001) and for a woman who received poor emotional support from her partner the odds were 3.8 times greater (Exp (B) =3.77, 95% CI 1.62 to 8.78, p = 0.002).

Table 15.9. Logistic regression model 3: Categorical variables in early pregnancy contributing to postnatal depression

Early pregnancy variables	**B**	**S.E.**	**Wald**	**df**	**Sig.**	**OR (95.0% C.I).**
History of depression	1.0	.30	10.77	1	.001	2.70 (1.49, 4.88)
New job	.30	.31	.94	1	.331	1.35 (0.74, 2.45)
Relationship with partner	.03	.54	.00	1	.955	1.03 (0.36, 2.98)
Emotional support from partner	1.33	.43	9.49	1	.002	3.77 (1.62, 8.78)
SES	-.54	.38	2.03	1	.155	0.59 (0.28, 1.22)
Constant	-2.23	.19	133.75	1	.000	0.11

15.2.3 All significant early pregnancy variables as predictors of postnatal depression

Having built separate models to explore the measurement scales and the risk factors identified in the literature as contributing to postnatal depression, a further binary logistic regression model was built, using the 'enter' method, combining all the early pregnancy variables found to be significant, but excluding depression in early pregnancy.

The model was significant (chi square = 66.4, 5df, p <0.001, n = 504), accounted for between 12% and 22% of the variance in EPDS 3 scores and correctly classified 87% of cases. The sensitivity was 16%, the specificity 98% and the positive predictive value was 58%.

Table 15.10 illustrates that with all the variables added only the EPS 1, poor physical wellbeing and low self esteem made a significant contribution to the prediction of postnatal depression. The model indicates that, after adjusting for poor physical health and low self-esteem, the odds of a woman with poor emotional processing in early pregnancy developing postnatal depression are 2.6 times higher than a woman who manages her emotions well. (Exp (B) = 2.6, 95% CI 1.3 to 5.3, p = 0.007).

Table 15.10. Logistic regression model 4: Measurement scale and categorical variables in early pregnancy contributing to postnatal depression (excluding depression)

Early pregnancy variables	B	S.E.	Wald	df	Sig.	OR (95% CI)
History of depression	.51	.33	2.38	1	.123	1.66 (0.87,3.14)
Emotional support from partner	.60	.42	2.03	1	.154	1.83 (0.80,4.19)
Emotional processing high scores	.97	.36	7.37	1	.007	2.64 (1.31,5.32)
Physical wellbeing 1	-.06	.02	9.29	1	.002	0.94 (0.91, 1.0)
Self-esteem 1	-.09	.03	7.57	1	.006	0.91 (0.85,0.97)
Constant	2.67	1.14	5.49	1	.019	14.47

When the model was built again adding depression in early pregnancy (as measured on the EPDS 1), all the variables with the exception of depression and physical health ceased to be significant.

15.2.4. All significant early pregnancy variables plus birth events as predictors of postnatal depression

Having shown that, when antenatal depression is excluded, emotional processing in early pregnancy is the strongest predictor of postnatal depression a further model was built entering variables associated with birth events which have been identified in the literature to be potential triggers for postnatal depression (satisfaction with birth experience, postnatal pain/discomfort and infant feeding difficulties) (Ingram et al. 2003; Johnstone et al. 2000), and emotional processing, physical wellbeing and self-esteem in order to determine which variable overall is the strongest in predicting depression. The model correctly predicted 88% of cases of postnatal depression and accounted for between 15% and 27% of the variance (chi square = 85.3, 6df, p <0.001, n = 534). The sensitivity if the model was 20% and the specificity was 99%. The positive predictive value was 68%. (Table 15.11).

Table 15.11. Classification table for all significant early pregnancy and birth events predictors

Observed		Predicted		
		EPDS 3 high and low scores		
		12 and below	13 and above	Percentage Correct
EPDS 3 high and low scores	12 and below	452	7	98.5
	13 and above	60	15	20.0
	Overall Percentage			87.5

a. The cut value is .500

Table 15.12 shows the prediction values of all the variables. All of the variables except physical health in early pregnancy and postnatal pain/ discomfort made a

significant contribution to the logistic regression model, which selected in order satisfaction with birth experience, EPS high score, infant feeding problems and self esteem. The model shows that, after adjusting for all the other variables, the odds of a woman with poor emotional processing in early pregnancy developing postnatal depression are 2.7 times greater than a woman who processes her emotions well (Exp(B) = 2.7, 95% CI 1.4 to 5.3, p = 0.004).

Table 15.12. Logistic regression model 5: All early pregnancy and birth events variables contributing to the prediction of postnatal depression

Early pregnancy & birth variables	B	S.E.	Wald	df	Sig.	OR (95.0% C.I).
Emotional processing high scores	.99	.34	8.33	1	.004	2.70 (1.38, 5.29)
Physical wellbeing 1	-.03	.02	2.73	1	.098	0.97 (0.93,1.01)
Self-esteem 1	-.14	.03	18.04	1	.000	0.87 (0.81, 0.93)
Satisfaction with birth	1.05	.30	12.47	1	.000	2.86 (1.60,5.13)
Postnatal pain	.65	.48	1.88	1	.170	1.92 (0.76, 4.87)
Feeding problems	.67	.29	5.41	1	.020	1.95 (1.11, 3.42)
Constant	1.30	1.30	1.00	1	.317	3.69

When depression in early pregnancy was added to this model physical health in early pregnancy, satisfaction with birth experience and problems with feeding continued to make a significant contribution to the model along with depression. A high emotional processing score did not. Satisfaction with the birth experience made the strongest unique contribution and after adjusting for all the other significant variables the odds of a woman who had a poor experience of birth having a high score on the EPDS 3 were 2.6 times higher than a woman whose experience was good (Exp (B) 2.63, 95% CI 1.42 to 4.88, p = 0.002).

15.2.5 High EPS scores in late pregnancy and measurement scale variables as predictors of postnatal depression

A further model was built to assess the predictive quality of high emotional processing scores, physical and mental wellbeing and self esteem measured in

late pregnancy. EPS 2 scores were dichotomized into high (4.6 and above) and low (4.5 and below). The goodness of fit test was highly significant (chi-square = 99.2, 4 df, p <0.001, n = 519) showing that the model performed well. Between 17% and 32% of the variance in EPDS scores were explained by the model. Table 15.13 illustrates the classification of high and low EPDS 3 scores. It shows that the model correctly predicted 88% of the cases of postnatal depression with the sensitivity of the model being 32% and the specificity 96%. The positive predictive value was 58%.

Table 15.13. Classification of high and low EPDS 3 scores from late pregnancy measurement scale predictors

Observed		Predicted		
		EPDS 3 high and low scores		
		12 and below	13 and above	% Correct
EPDS 3 high and low scores	12 and below	431	17	96.2
	13 and above	48	23	32.4
	Overall Percentage			87.5

a. The cut value is .500

Table 15.14 shows that in late pregnancy only high emotional processing scores and mental wellbeing contributed significantly to the model. After adjusting for poor mental wellbeing, the odds of a woman with high emotional processing scores in late pregnancy developing postnatal depression are 4.7 times greater than a woman with low EPS 2 scores (Exp(B) = 4.7, 95% CI 2.2 to 9.8, p <0.001).

Table 15.14. Logistic regression model 6: Measurement scale variables in late pregnancy predicting postnatal depression (excluding depression)

Late pregnancy measurement scale variables	B	S.E.	Wald	df	Sig.	OR (95.0% C.I).
Emotional processing high score 2	1.54	.38	16.73	1	.000	4.68 (2.24, 9.81)
Physical wellbeing 2	-.03	.02	2.87	1	.090	0.97 (0.94, 1.01)
Mental wellbeing 2	-.05	.02	6.29	1	.012	0.95 (0.92, 1.00)
Self-esteem 2	-.05	.04	1.80	1	.179	0.95 (0.89, 1.02)
Constant	2.32	1.16	3.99	1	.046	10.15

The model was repeated entering EPDS 2 scores. The model continued to be a good fit (chi square 106.04, 5df, p <0.001). The sensitivity was 36.6%, the specificity 96.4% and the positive predictive value 61.9%. Only high scores on the EPS 2 (Exp (B) = 3.39, 95% CI 1.56 to 7.36, p = 0.002) and mean EPDS 2 scores (Exp(B) = 1.15, 95% CI 1.03 to 1.27, p = 0.01) made a significant contribution to the prediction model, illustrating that after adjusting for depression in late pregnancy the odds of a woman with high EPS scores having postnatal depression were 3.4 times higher than a woman with low scores.

15.2.6 All late pregnancy variables as predictors of postnatal depression

Multiple regression models entering late pregnancy variables identified in order lack of practical support from partner, poor emotional processing, low self esteem and poor mental wellbeing as significant predictors of EPDS 3 scores. A binary logistic regression model was built entering these variables to determine which late pregnancy variables best predicted postnatal depression.

The model was highly significant (chi square = 94.4, 4df, p <0.001, n = 516), correctly identified 88% of cases of postnatal depression and accounted for between 17% and 31% of the variance. The sensitivity of the model was 31%, the specificity was 96% and the positive predictive value was 58% (Table 15.15).

Table 15.15. Classification table for late pregnancy variables

Observed		Predicted		
		EPDS 3 high and low scores		
		12 and below	13 and above	% Correct
EPDS 3 high and low scores	12 and below	430	16	96.4
	13 and above	48	22	31.4
	Overall Percentage			87.6

a. The cut value is .500

As can be seen from Table 15.16, practical support from partner and low self-esteem ceased to be significant in the prediction of postnatal depression. The late pregnancy variable making the highest unique contribution to postnatal depression was mental wellbeing, although emotional processing continued to be significant. After adjusting for mental wellbeing in late pregnancy the odds of a woman with high scores on the EPS 2 developing postnatal depression were five times higher than a woman with low scores (Exp (B) = 5.38, 95% CI 2.52 to 11.49, p <0.001).

Table 15.16. Logistic regression model 7: Late pregnancy variables contributing to the prediction of postnatal depression (excluding depression)

Late pregnancy variables	B	S.E.	Wald	df	Sig.	OR (95.0% C.I).
Practical support from partner	-.64	.53	1.48	1	.223	0.53 (0.19, 1.48)
Emotional processing high score 2	1.68	.39	18.83	1	.000	5.38 (2.52,11.49)
Mental wellbeing 2	-.042	.02	4.77	1	.029	0.96 (0.92, 1.00)
Self-esteem 2	-.07	.04	3.43	1	.064	0.94 (0.87, 1.00)
Constant	2.81	.74	14.32	1	.000	16.61

Table 15.17 illustrates that when depression in late pregnancy (EPDS 2) was added to the model mental wellbeing ceased to be significant and only high emotional processing scores and EPDS 2 scores were significant. The model illustrated that after adjusting for the effects of antenatal depression in late

pregnancy the odds of a woman with high scores on the EPS 2 developing postnatal depression were 3.5 times greater than a woman with low scores (Exp (B) = 3.53, 95% CI 1.60 to 7.77, p = 0.002).

Table 15.17. Logistic regression model 8: Late pregnancy variables contributing to the prediction of postnatal depression (including depression)

Late pregnancy variables	B	S.E.	Wald	df	Sig.	OR (95.0% C.I).
Practical support from partner	-.585	.534	1.197	1	.274	0.56 (0.20, 1.59)
Emotional processing high score 2	1.261	.402	9.836	1	.002	3.53 (1.60, 7.77)
Mental wellbeing 2	-.006	.013	.196	1	.658	1.00 (0.97, 1.02)
Self-esteem 2	-.011	.040	.076	1	.783	0.99 (0.91, 1.07)
Depression 2	.147	.052	8.151	1	.004	1.16 (1.05, 1.28)
Constant	-2.849	1.550	3.378	1	.066	.058

15.2.7 Late pregnancy and birth related variables as predictors of postnatal depression

A further logistic regression model was built entering the late pregnancy variables identified as significant above in model 7 together with the birth related variables (satisfaction with birth experience, infant feeding problems and postnatal pain/discomfort). The model was highly significant (chi square = 111.6, 5df, p <0.001, n = 516), accounted for between 20% and 35% of the variance and correctly predicted 88% of cases of postnatal depression correctly. The sensitivity of the model was 32%, the specificity was 96% and the positive predictive value was 64%.

Table 15.18 shows that postnatal pain did not contribute significantly to the model and infant feeding problems were marginally statistically significant. Emotional processing made the greatest unique contribution. The model identified that, after adjusting for satisfaction with birth events and mental wellbeing, the odds of a woman with poor emotional processing in late

pregnancy developing postnatal depression are 6 times greater than a woman who manages her emotions well (Exp(B) = 6.1, 95% CI 2.9.to 12.9, p <0.001).

Table 15.18. Logistic regression model 9: Late pregnancy and birth related variables contributing to the prediction of postnatal depression

Late pregnancy and birth related variables	B	S.E.	Wald	df	Sig.	OR (95.0% C.I).
Emotional processing high scores 2	1.81	.38	22.30	1	.000	6.10 (2.88, 12.93)
Mental wellbeing 2	-.06	.02	11.20	1	.001	0.94 (0.91, 0.97)
Satisfaction with birth	.97	.32	9.18	1	.002	2.64 (1.41, 4.95)
Infant feeding problems	.62	.31	3.97	1	.046	1.86 (1.01, 3.42)
Postnatal pain/discomfort	.58	.49	1.42	1	.234	1.78 (0.69, 4.61)
Constant	-.66	1.04	.40	1	.529	0.52

When depression in late pregnancy (EPDS 2) was added to model 9, mental wellbeing ceased to be significant and in order the model identified as significant emotional processing (Exp (B) = 3.26, 95% CI 1.47 to 7.20, p = 0.004), satisfaction with birth experience (Exp (B) = 2.78, 95% CI 1.46 to 5.29, p = 0.002) and depression in late pregnancy (EPDS 2) (Exp (B) = 1.19, 95% CI 1.08 to 1.30, p<0.001).

15.2.8 Summary of predictive value of high emotional processing scores

The models built have shown that emotional processing measured in either early or late pregnancy makes a significantly unique contribution to the prediction of postnatal depression, after adjusting for other significant variables in the model and when excluding depression in early pregnancy. Table 15.19 summarises the odds of a woman with poor emotional processing in pregnancy developing depression postnatally, depending on the variables present. The sensitivity, specificity and positive predictive value of each model is presented.

Table 15.19. Summary of logistic regression analysis of variables predicting postnatal depression

Models	Significant variables in order defined by model	Number	Odds ratios from logistic regression			Evaluation of model		
			OR	95% C.I.		Sensitivity	Specificity	PPV
				lower	upper	%	%	%
1	**Emotional processing 1**	535	**2.52**	1.25	5.11	15	99	58
	Physical wellbeing 1		0.95	0.92	0.98			
	Self-esteem 1		0.91	0.85	0.97			
4	**Emotional processing 1**	504	**2.64**	1.31	5.32	16	98	58
	Physical wellbeing 1		0.94	0.91	1.00			
	Self-esteem 1		0.91	0.85	0.97			
5	Satisfaction with birth	534	2.86	1.60	5.13	20	99	68
	Emotional processing 1		**2.70**	1.38	5.29			
	Infant feeding problems		1.95	1.11	3.42			
	Self-esteem 1		0.87	0.81	0.93			
6	**Emotional processing 2**	519	**4.68**	2.24	9.81	32	96	58
	Mental wellbeing 2		0.95	0.92	1.00			
7	Mental wellbeing 2	516	0.96	0.92	1.00	31	96	58
	Emotional processing 2		**0.19**	0.09	0.40			
8	**Emotional processing 2**	520	**3.53**	1.60	7.77	37	97	63
	Depression in late pregnancy		1.16	1.05	1.28			
9	**Emotional processing 2**	516	**6.10**	2.88	12.93	32	96	64
	Satisfaction with birth		2.64	1.41	4.95			
	Mental wellbeing 2		0.94	0.91	0.97			

1 = EPS 1 high/low, PCS 1, MCS 1, RSE 1
4. = History of depression, emotional support from partner, EPS 1 high/low, PCS 1, RSE 1
5 = EPS high/low1, PCS 1, RSE 1, satisfaction with birth, postnatal pain, infant feeding problems
7 = EPS 2 high/low, PCS 2, MCS 2, RSE 2
7 = Practical support from partner, EPS 2 high/low, MCS 2, RSE 2
8 = Practical support from partner, EPS 2 high/low, MCS 2, RSE 2, EPDS 2
9 = EPS 2 high/low, MCS 2, satisfaction with birth, infant feeding problems, postnatal pain

15.3. EPS 1 sub-scales as predictors of postnatal depression

In order to determine how well the sub-scales of the EPS 1 predict high scores on the EPDS 3 a further binary logistic regression model was built using the sub-

scales as a continuous score rather than dichotomizing into high and low as done previously with the total EPS scores. The model was highly significant (chi square = 78, 5df, p <0.001, n = 554) and correctly predicted 86% of cases. It accounted for between 13% and 24% of the variance in EPDS 3 scores. The sensitivity of the model was 9% and the specificity 98%. The positive predictive value was 41% (Table 15.20).

Table 15.20. Classification table for EPS 1 sub-scales

Observed		Predicted		
		EPDS 3 high and low scores		
		12 and below	13 and above	% Correct
EPDS 3 high and low scores	12 and below	458	10	97.9
	13 and above	69	7	9.2
	Overall Percentage			85.5

a. The cut value is .500

Table 15.21 presents the statistics for the variables in the model and shows that only 'unregulated emotions' in early pregnancy is a significant predictor of postnatal depression. The odds of a woman having postnatal depression increases 1.2 fold for each unit increase in the 'unregulated emotions' component of the EPS 1 (Exp(B) = 1.2, 95% CI 1 to 1.5, p = 0.04).

Table 15.21. Logistic regression model 10: Predictive powers of EPS 1 sub-scales

EP sub-scales in early pregnancy	**B**	**S.E.**	**Wald**	**df**	**Sig.**	**OR (95.0% C.I).**
Suppression	.13	.09	2.34	1	.126	1.14 (0.96, 1.35)
Unregulated emotions	.20	.10	4.10	1	.043	1.22 (1.01,1.47)
Impoverished emotions	-.01	.12	.01	1	.916	1.00 (0.78, 1.25)
Unprocessed emotions	.15	.10	2.30	1	.130	1.17 (0.96, 1.43)
Avoidance	.19	.11	2.99	1	.084	1.21 (0.98,1.50)
Constant	-3.97	.35	125.73	1	.000	0.02

The model was built again entering the EPS 2 sub-scales. Again the model was highly significant (chi square =91.3, 5df, p <0.001, n = 525). The model accounted for between 16% and 29% of the variance in EPDS 3 scores and correctly predicted 87% of cases. The sensitivity of the model was 22% and the specificity was 98%. The positive predictive value was 62% (Table 15.22).

Table 15.22. Classification table for EPS 2 sub-scales

Observed		Predicted		
		EPDS 3 high and low scores		
		12 and below	13 and above	% Correct
EPDS 3 high and low scores	12 and below	443	10	97.8
	13 and above	56	16	22.2
	Overall Percentage			87.4
a. The cut value is .500				

Table 15.23 presents the regression model consisting of the EPS sub-scales measured in late pregnancy. Only 'unprocessed emotions' were significant, indicating that the odds of a woman having postnatal depression are 1.3 times higher for each unit increase in the 'unprocessed emotions' subscale of the EPS 2 (Exp(B) = 1.3, 95% CI 1 to 1.6, p = 0.04).

Table 15.23. Logistic regression model 11: Predictive powers of EPS 2 sub-scales

EPS 2 sub-scales	B	S.E.	Wald	df	Sig.	OR (95.0% C.I).
Suppression	.10	.09	1.09	1	.296	1.10 (0.92, 1.32)
Unregulated emotions	.16	.12	1.84	1	.175	1.17 (0.93, 1.47)
Impoverished emotions	.08	.13	.44	1	.509	1.09 (0.85, 1.39)
Unprocessed emotions	.23	.11	4.31	1	.038	1.26 (1.01, 1.57)
Avoidance	.14	.11	1.66	1	.197	1.15 (0.93, 1.41)
Constant	-4.26	.39	118.95	1	.000	0.01

Summary

The chapter explored how well the variables measured in early and late pregnancy predicted high scores on the EPDS 3, indicating the likelihood of postnatal depression occurring. It demonstrated that women with high emotional processing scores in pregnancy had correspondingly significantly high scores on the EPDS postpartum. The chapter has also illustrated that in early pregnancy, when taking into account risk factors identified in the literature, emotional processing still appears to be a strong predictor of postnatal depression. However when early antenatal depression is added all of the risk factors including emotional processing cease to be significant. The exception is physical health, which continues to significantly predict depression postpartum.

The chapter continued to explore late pregnancy variables and results showed that although depression in late pregnancy significantly predicts postnatal depression, emotional processing is a stronger predictor. Other results presented in the chapter have shown that when the events of birth are added to prediction models a high emotional processing score in early pregnancy can still predict postnatal depression but it is not as strong as dissatisfaction with the birth. Moreover when early antenatal depression is added, emotional processing ceases to be significant. Emotional processing in late pregnancy, however, was shown to be the strongest predictor of postnatal depression, even when late antenatal depression and dissatisfaction with birth events is present.

The chapter concluded with an exploration of the predictive value of the EPS sub-scales in early and late pregnancy. Findings were presented showing that only 'unregulated emotions' in early pregnancy made a significant contribution to the prediction of postnatal depression, whereas in late pregnancy only 'unprocessed emotions' was a significant predictor.

These findings will be discussed in further detail in the following chapter.

16: DISCUSSION OF FINDINGS

Introduction to chapter

The aim of this study was to discover what role the way women process their emotions plays in the development of the psychological stresses of pregnancy and childbirth. Specifically the study aimed to test the hypothesis that childbearing women who have difficulty processing their emotions may suffer a higher rate of postnatal depression. The purpose was therefore to examine the relationship between scores on the EPS 1 and 2, which would indicate how women were managing their emotions in pregnancy and scores on the EPDS 3, indicating the likelihood or not of women developing postnatal depression. It was anticipated that women who were identified as having impaired emotional processing during their pregnancy would score more highly on the EPDS at six weeks postpartum, indicating that they were at greater risk of developing postnatal depression. The study further aimed to investigate whether it was possible to predict the development of postnatal depression from scores on the EPS.

The findings presented in the previous chapters have demonstrated that the hypotheses appear to be true and shown strong associations between poor emotional processing and the likelihood of postnatal depression occurring. The predictive power of the EPS has also been demonstrated, providing the odds of a woman with impaired emotional processing in pregnancy subsequently suffering from depression postpartum.

This chapter discusses the results in detail, demonstrating how the findings of this study concur with those of other studies, but also identifying new knowledge uncovered which might lead to further strategies for the management of perinatal mental health.

16.1 The sample

A major problem with a cohort study such as this current one is the study mortality, or the number of people who drop out over time (Rees 2011). Nine hundred and seventy four women agreed to participate in the study and subsequently 520 of them (53%) completed all three questionnaires. Where the response rate of a study is below 50% the representativeness of the sample returned may be questioned as there is no certainty that the responses received represent those of all the participants sent the questionnaire, thus making generalisations difficult (Burns and Grove 2009). In this study however, when factors for non-response such as miscarriage, termination for abnormality, house move out of the area and non-receipt of follow-up questionnaire (discussed in Chapter 7) were taken into account the response rate for Q2 was 75% and for Q3 was 63%. Power calculations identified that the study required 452 participants responding to all three questionnaires to give 90% power to detect significant differences in scores. As 554 women responded to all three questionnaires the sample size would appear to be appropriate.

The reasons for non-participation in the study are unknown. Lack of anonymity and fear of being identified as depressed may have prevented some women from taking part, although Matthey et al. (2010) have shown that responses to self report measures of mood or depression are unlikely to be affected by whether or not a name is attached. Despite some studies highlighting the non- acceptability of being screened for postnatal depression (Shakespeare et al. 2003), a factor which may have prevented women from taking part in this research, other studies have found the EPDS an acceptable measure for most women (Brealey et al. 2010). Carter et al. (2005) found that women were happy to be recruited to a depression screening survey and that difficulties were only encountered when they were expected to participate in treatment regimes. It seems more likely therefore that some women did not wish to participate in this study because of the perceived time and commitment involved in completing three booklets over the course of pregnancy and postpartum.

There is no way of knowing the demographics of women who declined to participate in the study in the first instance to determine whether they differed from those who agreed to take part. However an examination of the age, parity and SES of those women who failed to respond to subsequent questionnaires or withdrew from the study revealed that although parity did not make any difference to responses, age and SES did. Results showed that the youngest age group and those from routine occupations such as shop assistants, care assistants and waitresses were least likely to respond, while a good response rate was received from women of 30 and over and those in managerial and professional occupations. A study by Baker et al (2005), which explored reasons that influence women's decisions to participate in research studies, found that a major reason for participation was a desire to 'give something back' and contribute to knowledge which would enhance care. It is possible therefore that these reasons provided greater motivation to more mature professional women to continue participating in this study than to younger women. Despite the drop out from younger women however there was a normal distribution of ages for the women who completed all three questionnaires and the percentage of women in routine occupations (17%) was also almost as equally well represented in Q3 as the professional group (22%).

Statistics presented in Chapter 7 confirm that the participants in this study were similar to other populations of women. The majority of women were white British or European (93%) and this is comparable with the population of the UK as a whole (Office for National Statistics 2001). Reflecting the larger British population, Asian (Indian, Pakistani and Bangladeshi), African-Caribbean and Chinese women made up the remainder of the sample. Fifteen percent of the multiparous women taking part had suffered from postnatal depression in previous pregnancies and this is comparable with average figures of between 13% and 19% found in the literature (O'Hara and Swain 1996; Gavin et al. 2005).

The number of women in the study having an elective or emergency caesarean section (20%) was slightly lower than the national average of 24.6% (The

Information Centre 2009). Eighty two per cent of babies born to women in the study were breastfed immediately after birth. Early results from the 2010 Infant Feeding Survey for the UK indicate that this figure is comparable to the latest national average which has increased from 76% in 2005 to 81% in 2010 (The Information Centre 2011). The prevalence of breastfeeding at six weeks postpartum in the current study fell to 53.4%. Latest prevalence figures are not yet available but this is slightly higher than the average prevalence of breastfeeding at six weeks of 48% for England and Wales identified in the 2005 Infant Feeding Survey (Bolling et al. 2007).

Despite the loss to follow-up, therefore, the demographics of the participants in the study are fairly representative of the UK population as a whole. Birth statistics and breast feeding rates differ slightly from other parts of the country and this should be considered when exploring further findings relating to these.

16.2 Health and wellbeing outcomes

The study provided a comprehensive picture of the emotional, physical, and psychological wellbeing of the participants.

16.2.1 Emotional wellbeing

Results showed that emotional processing did not change significantly over time, although mean scores appeared to be generally higher at the beginning of pregnancy and become lower in later pregnancy and postpartum. Overall mean EPS scores of women completing all three questionnaires were 0.3 lower than mean scores for all women who completed EPS 1 scores. This might suggest that women with higher scores (and thus more difficulty processing emotions) may have been less likely to return later questionnaires. It is difficult, however, to speculate on what the scores of those women who withdrew from the study would have been. As scores of all women completing the EPS 1 were higher it is possible that had the non-responders remained in the study, mean EPS scores in

late pregnancy and postpartum would have been higher. However, mixed model analysis, used to account for missing data, reinforced the information gained from observation of the available mean scores at each time point –that there were significant changes over time and both EPS 1 scores and EPS 2 scores were significantly higher than EPS 3 scores. Between the three time points the greatest increase was between early and late pregnancy and the greatest decrease between early pregnancy and postpartum.

Emotions therefore appear to be managed better as pregnancy progresses and the baby is born. As the processing of emotions relates to stressful life events this finding links quite well to a study by Glynn et al. (2004) which explored how pregnancy affected women's appraisal of negative life events. The authors found that emotional responding changed as pregnancy advanced such that events occurring early in pregnancy were perceived as more stressful than those occurring later in pregnancy (Glynn et al. 2004). Exploration of the performance of the individual sub-scales involved in emotional processing might help to provide further understanding of the changes.

Results showed that the subscale 'unprocessed emotions' had the highest mean score at each of the three time points, although the time point that the assessment was made did not make any significant difference to the score. The questions relating to unprocessed emotions were: Unwanted feelings kept intruding; my emotional reactions lasted for more than a day; I tended to repeatedly experience the same emotion; I felt overwhelmed by my emotions; I kept thinking about the same emotional situation again and again. The results suggest that many of the women in the study were experiencing a great deal of emotional material that they found difficult to manage. This might be due to hormonal influences or to concerns about the wellbeing of the baby, the forthcoming birth and impending parenthood (Miller et al. 2006; Grant et al. 2008). Although 'unprocessed emotions' was the highest sub-scale score for all women, the younger age groups (19 and under and 20 to 24 years) appeared to have the greatest difficulty, which might reflect a lack of support, finance or

concerns about their future or possibly their immaturity in dealing with their emotions, especially at such a potentially stressful time (Zachariah 2009; Hurley 2010). 'Unprocessed emotions' was also the highest scoring subscale among healthy people in the UK completing the EPS (Baker et al. 2007a), although in fact the women in this study had lower scores than the UK norm at each point. This suggests that although women experienced many emotions during the childbirth continuum, they were no different from other non-pregnant healthy people and in fact may have coped better with their range of emotions. The norms for healthy people in the UK are presented in Appendix 4.1.3.

Scores for the 'impoverished emotions' subscale were the lowest at each time point, again reflecting the norms for a healthy group of people (Baker 2007a). Changes over time were significant. The questions containing the 'impoverished emotions' element were: My emotions felt blunt or dull; My feelings did not seem to belong to me; It was hard to work out whether I felt ill or emotional; There seemed to be a big blank in my feelings; Sometimes I got strong feelings but I'm not sure if they were emotions. Scores for 'impoverished emotions', although the lowest of all the sub-scales, were highest in the early antenatal period which would suggest that at the beginning of their pregnancy women may have felt a little shell-shocked as they came to terms with their pregnancy and its implications. This would seem especially relevant to the younger women who had significantly higher scores than the older age groups who may have planned and been better prepared (Zachariah 2009). However, as their health and that of their baby progressed well, brighter emotions and a sense of achievement and wellbeing developed. Perhaps also as pregnancy progressed women became more attuned to their emotions and more able to understand and handle the feelings they were experiencing. In the postpartum period 'impoverished emotions' scores rose again slightly, perhaps suggesting that women, facing their new role and responsibilities of motherhood were again faced with a sense of anxiety and shell-shock (Nicolson 2001; Wolfe 2001; Wilkins 2006).

Scores on the 'avoidance' subscale reduced significantly over time, with age making no significant difference to scores. Questions relating to 'avoidance' were: I avoided looking at unpleasant things; talking about negative feelings seemed to make them worse; I tried to talk only about pleasant things; I could not tolerate unpleasant feelings; I tried very hard to avoid things that might make me upset. In general the scores reflected the norms for healthy people in the UK (Baker 2007a). Higher scores in pregnancy might suggest that in early pregnancy women were concerned about fetal outcomes (abnormality, miscarriage for example) and so avoided engaging with unpleasant thoughts. Later they were immersed in their pregnancy and wanted to shield themselves from unpleasantness in the world and worries about the outcome of the birth in order to protect themselves and their baby. Postpartum, 'avoidance' scores were lower among the women in the study than the UK healthy norms (Baker 2007a), perhaps demonstrating that more practical concerns about care of the newborn had become a greater priority (Choi et al. 2005; Wilkins 2006) and, no longer able to avoid the inevitable pressures of motherhood, the women had come to terms with their emotions.

Scores on the 'suppression' subscale also changed significantly over time, with scores increasing at each time point. Each of these scores, however, was lower than the norm for healthy adults in the UK (Baker 2007a). Again age did not make a difference to the scores. Questions relating to 'suppression' were: I smothered my feelings; I could not express my feelings; I kept quiet about my feelings; I bottled up my emotions; I tried not to show my feelings to others. Antenatally 'suppression' was the second lowest scoring sub-scale at both time points, suggesting that women had little problem expressing their emotions, possibly because it is generally recognised that pregnancy can be a stressful time for women and therefore it is acceptable to express emotions more openly. However, postpartum it appeared that women felt a greater need to hide their emotions from others. This could relate to a need to appear to be coping in the new role of mother and not be seen as failing in society's ideal of 'supermum' or the 'nurturing Madonna' (Nicolson 2001; Choi et al. 2005; Wilkins 2006). Or it

could relate in some cases to women's feelings of disappointment or distress about their birth experience which they needed to suppress to avoid facing painful memories or reliving the sensations of the event.

Results showed that scores on the 'unregulated emotions' subscale did not change significantly over time, with the scores sitting in the middle of the sub-scale scores at both stages in pregnancy and second highest postnatally. Questions relating to 'unregulated emotions' were: when upset or angry it was difficult to control what I said; I reacted too much to what people said or did; I wanted to get my own back on someone; I felt the urge to smash something; It was hard for me to wind down. On average the scores for 'unregulated emotions' reflected the norms identified for a group of healthy adults in the UK (Baker 2007a). The results would suggest that women were fairly stable in controlling the wide range of emotions engendered by pregnancy and childbirth.

16.2.2 Psychological wellbeing

According to their EPDS scores women in the study appeared to be more likely to have signs of depression antenatally, especially in early pregnancy, than postpartum. As with the EPS scores a possible explanation for this is that women with higher scores, and who were thus more likely to be depressed in early pregnancy did not complete subsequent questionnaires. However, despite this, these findings reinforce other studies which show that antenatal depression is as great a concern as postnatal depression (Evans et al. 2001; Josefsson et al. 2001; Bunevicius et al. 2009).

This study showed that depression fell very slightly from 19% in early pregnancy to 18% in late pregnancy. Although only a very small difference, the findings are in contrast to an earlier UK cohort study comparing mothers' mood during pregnancy and postpartum (Evans et al. 2001), which showed that depression rates, measured by scores of 13 and above on the EPDS, revealed a rise in depression scores from early pregnancy to a peak in late pregnancy followed by a fall postpartum. Not only is the trend in this current study slightly different but

the figures are also higher than the earlier study which found that 12% of UK women were depressed at 18 weeks antenatally and 13.5% at 32 weeks (Evans et al. 2001).

The percentage of women displaying signs of antenatal depression in the current study is also much greater than those found in a study in the Netherlands which screened 230 women for antenatal depression (Bunevicius et al. 2009). As with the current study, the percentage of women experiencing signs of depression in early pregnancy was greater than in late pregnancy, with 5% of women in the first trimester suffering from depression and 3% in the second trimester. The study, however, used a lower cut-off for the EPDS (12 for the first trimester and 11 for the second) (Bunevicius et al. 2009). The actual differences in the percentage of women showing signs of depression at each stage antenatally were much greater in the current study therefore, considering the higher EPDS threshold used.

Depression rates more similar to the current study were identified in an American study of women attending antenatal obstetric clinics (Marcus et al. 2003), although a different measure of depression, the CES-D, was used. In that study 20% of women were found to be showing signs of depression in the second trimester of pregnancy. However, a longitudinal study of 1,558 Swedish women, measuring the prevalence of depressive symptoms in pregnancy and postpartum, using an EPDS threshold of 10 and above found the prevalence of depression at 35 to 36 weeks to be 17% (Josefsson et al. 2001). Although the cut-off is different these results are similar to the percentage of women displaying signs of depression in late pregnancy in the current study.

More relevant comparisons can be made, however, with the aforementioned UK study (Evans et al. 2001) which used the same measure of depression and the same threshold to identify possible depression. Moreover the demographics of UK participants in the study by Evans and colleagues are more likely to be comparable.

The percentage of women suffering from postnatal depression at six weeks postpartum was 14% as compared with 9.1% of women in the UK study by Evans et al. (2001) and consistent with 13% of women in the Swedish study by Josefsson et al. (2001). However, consistent with both studies this current study found that the number of women likely to have depression was lower in the postnatal period than during pregnancy. Possibly the reduction in depression postnatally was due to the mediating effects of the safe arrival of the newborn. It is difficult to determine whether the percentage of women suffering from postnatal depression is comparable with local or national statistics as there is no formal strategy in place for collecting such data. However the figures are consistent with those found in meta-analyses of studies determining the rates of postnatal depression (discussed in Chapter 1) which commonly quote between 13% (O'Hara and Swain 1996) and 19% (Gavin et al. 2005).

16.2.3 Physical and mental wellbeing

Physically, the women in the study felt well in early pregnancy. On average they appeared to experience little bodily pain and early pregnancy health did not limit any physical activities or cause difficulties with everyday life and work. In terms of general health, however, their perception that their health would worsen as pregnancy continued was strongest in early pregnancy, but as time progressed so their general health perceptions improved. This is consistent with the findings of Jomeen and Martin (2008). In their study of the effects of the choice of maternity care on women's psychological health outcomes the authors suggested that women's perception of ill health in early pregnancy is accentuated by the medical model of care in which they perceive that pregnancy is associated with ill health. A possible explanation for women's perceptions of impending poorer health may be that their fear of the unknown and information gleaned from friends, family, books and the media about the associated ailments of pregnancy might influence women's early expectations of their future health but as pregnancy progressed so worries receded. In late pregnancy women became more concerned about bodily pain, and their ability to carry out

everyday tasks was limited somewhat, probably due to the physical effects of pregnancy, such as increased weight. Yet they felt more positive in their expectations of their general health. However, where physical health deteriorated, the likelihood of postnatal depression developing increased. Postnatally, despite bodily pain continuing to be a concern for women, possibly due to the physical outcomes of the birth and breastfeeding difficulties, women felt they were able to resume normal physical activities. The bodily pain scores concur with the findings of Jomeen and Martin (2008), who suggested that they are due to a response to the physiological changes of pregnancy and birth and that women expect and accept them as an integral part of childbirth.

The general psychological health of women as identified by the MCS of the SF-36 was significantly poorer in early pregnancy and this reflects the scores on the EPDS which showed that more women scored over the threshold for depression in early pregnancy than in late pregnancy and postpartum. MCS mean scores, however showed that women's general psychological health was at its best in late pregnancy, before deteriorating again postpartum. This reflects the slight decrease in the percentage of women with possible antenatal depression in late pregnancy as compared with early, but not the continued decrease in depression scores postnatally. The differences may be due to the SF-36 measuring more multidimensional aspects of mental wellbeing than the EPDS and it may reflect the sense of wellbeing and serenity that pregnant women are anecdotally supposed to experience as pregnancy progresses. Nevertheless for women who displayed deteriorating psychological health during pregnancy there was an unsurprisingly greater likelihood of developing postnatal depression.

'Emotional role' scores were high across the time points demonstrating that emotional problems did not create any issues for women in managing their everyday lives. Yet, despite this, 'vitality', which is a component of the mental wellbeing measure, was the lowest scoring sub-scale at each time point, although the scores improved significantly over time. Low 'vitality' scores, indicating low levels of energy, are consistent with the findings of Jomeen and

Martin (2008) where women experienced their lowest levels of energy in early pregnancy followed by a mid trimester burst of 'get up and go'. A comparison of the 'vitality' sub-scale scores at each time point (39.4, 43.9 and 46.1 respectively) with UK normative data for 18 to 34 year old women (between 55.5 and 54.7) (Jenkinson et al. 1993), suggests that, on average, energy levels of women in pregnancy and postpartum are compromised. It would seem possible that the different physical changes associated with each stage of pregnancy may impact on energy levels in different ways. Jomeen and Martin (2008) suggested that the lowest energy levels in early pregnancy may reflect the tiredness and debilitating effects of nausea and vomiting experienced by many women, while in late pregnancy energy levels remain low, due probably to the increased burden of the growing fetus, but enhanced by the mid-trimester surge of wellbeing.

16.2.4 Self-esteem

Self-esteem is an important element of emotional wellbeing. The self-esteem of the women in the study was marginally, although not significantly, better postpartum than during pregnancy. As with the other measurement scales it may be that women with low levels of self-esteem did not continue to complete the series of questionnaires thus leaving those with higher self-esteem remaining. Another possible explanation might be that a certain pride engendered by a successful birth may have increased the value women placed upon themselves. This would link with the fact that women appeared better able to process their emotions postpartum as self-esteem and confidence are inextricably bound with the emotions of an individual (Macola et al. 2010).

For women with low self-esteem however, the likelihood of developing postnatal depression increased. Despite the fact that one study of 239 South Korean women, which attempted to predict postnatal depression from sociodemographic, psychological and obstetric factors, found no significant difference in the RSE scores of women who had depression postpartum and those who did not (Kim et al. 2008), the findings of this current study are consistent with those of a number of other international studies (Hall et al. 1996;

Matthey et al. 2004; Oppo et al. 2009). Indeed, in a study of 738 women in the USA, which examined the mediating role of self-esteem on the effects of stressors and social resources on the depressive symptoms of mothers postpartum, Hall et al. (1996) found that women with low self-esteem were 39 times more likely to have depressive symptoms than those with high self-esteem.

In a cross-sectional study conducted in Brazil to evaluate the self-esteem of 127 pregnant women in a prenatal care programme Macola et al. (2010) identified satisfactory self-esteem by a score of 30 or above out of the possible 40 on the RSE. If a score of 30 and above is an appropriate threshold to identify self-esteem then none of the women in this current study displayed a satisfactory level of self-esteem. Unfortunately as it was not possible to obtain a translation of the Spanish document used by Macola et al. (2010) to support their choice of threshold it is difficult to determine whether this cut-off, used with a Brazilian population, is appropriate for UK women.

16.3 Health outcomes and demographical variables

The parity of the women in the study did not appear to affect their ability to process emotions at all during the childbirth continuum. Nor did it seem to make a difference to their level of self esteem in early pregnancy. Interestingly though, in contrast to the findings of Macola et al. (2010) primiparous women appeared to have significantly lower self-esteem in late pregnancy than multiparous women.

According to their scores on the PCS of the SF-36, multiparous women were less well physically than primiparous women in late pregnancy, although this changed after the birth of the baby when first time mothers reported more physical symptoms than those with other children. The postnatal findings are in contrast to those found in a UK study by Morrell et al. (2000) which explored the benefits

of community support workers in reducing the risk of postnatal depression. In that study no significant differences in the PCS of primiparous and multiparous women were found at six weeks postpartum. Similarly, in contrast to the findings of Morrell et al. (2000), this current study found lower MCS scores in primiparous women than in multiparous women suggesting that in early pregnancy and postpartum first time mothers may find it more difficult to cope psychologically than women with children.

Consistent with a meta-analysis of rates and risks of postpartum depression undertaken by O'Hara and Swain (1996) which found no significant association between parity and postpartum depression, there was no significant difference between the rates of depression postnatally in primiparous and multiparous women in this current study, although at six weeks postpartum primiparas had higher depression scores than those with children. Antenatally primiparous and multiparous women experienced the same levels of antenatal depression.

In contrast, a study of over 2,000 women, exploring the prevalence of postpartum depression in two areas in Norway, showed a significantly higher prevalence of postnatal depression in primiparas at 6 weeks postpartum, using an EPDS threshold of 10 and above as a measure (Glavin et al. 2009). When stratified by age primiparous women aged 36 and over were twice as likely to show signs of postnatal depression than multiparous women. In contrast to Glavin et al. (2009) other studies have shown multiparity rather than primiparity to be a significant risk factor for postnatal depression (Righetti-Veltema et al. 1998; Mayberry et al. 2007; Skari et al. 2002). In a longitudinal study following a cohort of 127 Norwegian mothers and 122 fathers to compare psychological responses following birth, Skari et al. (2002) found that multiparity predicted psychological distress at six weeks postpartum. The findings are not directly comparable, however, as the authors used the General Health Questionnaire (Goldberg 1972) as a measure of psychological distress. Mayberry et al. (2007), in a cross-sectional study of the prevalence of depression rates up to 2 years postpartum in a diverse population of 1,359 women in the United States, found

that multiparity bestowed a greater likelihood of postnatal depression in a group of women who were up to six months postpartum. Their results were based on the same EPDS threshold as this current study. A possible explanation for the disparity in findings might be in the other confounding variables impacting on the psychological wellbeing of women. For example, for some primiparous women new motherhood will be very daunting (Wilkins 2006; Darvill et al. 2010) and for some multiparous women the stresses of managing a family and a newborn might be hard to cope with (Gameiro et al. 2009). However, as Mayberry et al. (2007) do not identify the number of multiparous women at the comparable time point of six weeks postpartum, direct comparisons are not possible.

There is evidence from the literature that older women display more resilience to physical ailments and ill-health and report fewer symptoms of depression and anxiety during pregnancy then their younger counterparts (Robb et al. 2005; McMahon et al. 2011). In agreement with this, younger women in the current study tended to experience more psychological and emotional health problems during pregnancy, although age did not result in any differences in physical health. Younger women tended to experience worse general psychological health than older women, as shown by scores on the MCS 1 and 2, and were significantly more likely to develop depression antenatally as identified from scores on the EPDS 1 and 2. Younger women also had more difficulty processing their emotions during pregnancy. A possible explanation for these findings might be that younger women feel more 'threatened' by the perceived authority of professionals undertaking screening and antenatal examinations and are less resilient than more mature women when faced with difficulties and interventions (Windridge and Berryman 1999; Robb et al. 2005). In the Leicester Motherhood Project which explored the experiences of women over 35 years of age giving birth, Windridge and Berryman (1995) found that although older women had higher levels of concern regarding the safety of the fetus during labour and birth they had a more mature appreciation of the childbirth process than the younger age groups and were consequently better adjusted

emotionally. Robb et al. (2005) in a study of 60 primiparous women in Scotland found that, despite being treated as a high risk group, older primiparous women appeared much more resilient in coping with the processes of pregnancy than younger women.

In contrast to the findings of Macola et al. (2010) women aged 35 and over in this current study had significantly higher self-esteem than the younger age groups. As self-esteem is closely linked to emotional wellbeing this finding is not surprising.

Studies have shown that age does not appear to significantly affect the risks of a woman developing postnatal depression (Wickberg and Hwang 1997; Tammentie et al. 2002). This fact was also true in this current study, where results revealed that postpartum, the age of a woman did not make any significant difference to her physical and psychological wellbeing, her self-esteem, her ability to process her emotions effectively or the likelihood of developing postnatal depression.

Consistent with the literature explored in Chapter 1 (O'Hara and Swain 1996; Beck and Gable 2001; Robertson et al. 2004; Milgrom et al. 2008), women reporting a past history of depression or anxiety, a past episode of postnatal depression and those with a family history of depression had worse general mental health and displayed a greater likelihood of developing depression at each time point. They also had significantly more difficulty processing their emotions throughout pregnancy and postpartum and their self-esteem was lower during pregnancy and after the birth of the baby. Interestingly these women also identified significantly greater physical problems in late pregnancy, possibly due to their mental state amplifying common pregnancy ailments, a finding identified by Kelly et al. (2001) in a study of somatic complaints among a group of 186 pregnant women the United States.

Women who were receiving treatment for a psychological condition in early pregnancy had greater problems processing their emotions, had lower self-

esteem and were more likely to develop depression antenatally. Considering their mental state this is not surprising. Postpartum there appeared to be no problems with these issues however. A possible explanation for this could be that their psychological condition had been managed or resolved by the time the baby was born and was therefore no longer a problem. Or possibly the birth of their child resulted in a resolution of the cause of the problem identified in early pregnancy.

Poor physical health in early pregnancy did not significantly affect women's general psychological health or their ability to process their emotions, although those women who needed medical treatment during pregnancy were significantly more likely to display signs of depression in late pregnancy. This is not surprising as concerns about their health and the welfare of the baby would likely prompt anxiety and low mood. Signs of depression were not long-term, however, the symptoms resolving once the baby was born safely.

During pregnancy those women in a poor partner relationship or with no partner tended to be less well psychologically, were more likely to be depressed, had lower self esteem and had greater difficulty processing their emotions. This finding is not surprising as single motherhood and poor relationships are associated with poorer physical and psychological outcomes (Whitehead et al. 2000; Butterworth 2004;; Bilszta et al. 2008). An Australian study of 1,578 women, which investigated the outcomes of single status and poor partner relationship on antenatal mental health outcomes, found that women in a poor relationship with a partner were significantly more likely to show signs of antenatal depression (as assessed by scores of 12 and over on the EPDS) than women without a partner, although the number of single women having elevated EPDS scores was still greater than the partnered cohort overall (Bilszta et al. 2008). This was considered to be more likely due to associated current and past emotional health than single status.

16.4 The relationship between emotional processing, previously established risk factors and postnatal depression

Studies have explored a wide range of psychosocial factors that appear to be related to the development of postnatal depression (Bergant et al. 1999; Brugha et al. 2000; Glazier et al. 2004) but this is the first time that emotional processing has been examined to determine whether the way women manage their emotions during the heightened emotional period of pregnancy and birth is associated with depression.

The complex nature of women's emotional and psychological wellbeing is demonstrated by the clear correlations between poor emotional processing, low self-esteem, poor physical and emotional health and postnatal depression. There was a significant difference in the mean pregnancy scores of all the measurement scales between women who did and those who did not subsequently develop postnatal depression, showing that those with poorer physical and psychological health and lower self-esteem were more likely to become depressed. This is not surprising considering that all have been identified in the literature as risk factors for postnatal depression (O'Hara and Swain 1996; Beck 2001; Robertson et al. 2004).

Results showed that women who scored above the threshold of 13 on the EPDS postpartum had mean EPS 1 scores of 1.8 higher (CI 1.4 to 2.2) than those women who had low EPDS 3 scores. In late pregnancy their mean EPS 2 scores were 2.2 higher (CI 1.8 to 2.6). When considering what would be a reasonable difference in scores to expect of women likely to develop postnatal depression 0.6 was considered appropriate. This was arrived at by looking at existing EPS scores from other studies, as identified in Chapter 5 (Baker et al. 2007b; Baker et al. 2010). The difference between the mental health group and the control group was 2.8 and between the pain group and the control group was 0.6. It was thought that the mental health/control group difference was too great a

difference to expect from women who were not necessarily suffering from a mental health disorder at the time the measurement was taken in pregnancy. Therefore the pain /control group difference was selected to reflect more closely the experiences of pregnant women possibly with pregnancy-related pain or discomfort. The difference in scores in this study is therefore a lot greater than anticipated, even more so considering that the differences between the pain group and the control group were taken when the pain group were actually experiencing the pain, whereas in this study the EPS was measured in anticipation of postnatal depression occurring in the future. The differences would not therefore be expected to be as great.

Regression modelling demonstrated the strength emotional processing had in predicting the likelihood of depression postnatally. Alone, without taking any other risk factors into consideration, poor emotional processing in early pregnancy was associated with a significant increase of 1.4 in mean EPDS scores postpartum. After adjusting for the effects of physical and psychological wellbeing and self-esteem, and even taking into consideration depression in early pregnancy, women who had difficulty processing their emotions had an average increase of 0.6 in postnatal EPDS scores. Only the sub-scales of 'unregulated emotions' and 'suppression' significantly predicted depression scores suggesting perhaps that women who had difficulty controlling the emotions they experienced but felt unable to express them adequately were more likely to suffer from depression. In late pregnancy poor emotional processing was an equally strong predictor of high postnatal depression scores (with 'unregulated' and 'unprocessed' emotions uniquely predicting depression). When late antenatal depression was added to the model, however, emotional processing was no longer significant. It appeared that in late pregnancy, regardless of her physical health, her self-esteem and her ability to process her emotions, if a woman suffered from antenatal depression then she was likely to have an average increase of 0.5 in her EPDS score postnatally. Interestingly this was not as great an increase as that predicted by poorer scores on the EPS in

early pregnancy when depression in early pregnancy was not included in the model.

It is essential, however, to examine other identified risk factors for postnatal depression to be fully confident that emotional processing is a strong predictor of higher postnatal depression scores. The literature identified depressed mood or anxiety during pregnancy, past history of depression, perceived low levels of support and life stresses as strong to medium risk factors for postnatal depression with poor marital relationship and SES being medium and small risk factors (O'Hara and Swain 1996; Beck 2001; Robertson et al. 2004). The findings of this study concur in part with this.

Results showed that a woman with a past personal history of depression would have on average a mean postnatal EPDS score 2.8 points higher than a woman without a history. A woman who changed her job would have an average score of one point higher than one who remained in the same job, but the odds of her developing postnatal depression were not statistically significant. No further explanation was sought in the questionnaires as to the nature of the job change but it is possible that the stresses of arranging maternity leave within a new work environment may have increased a woman's anxiety levels. In contrast to the findings of a Norwegian exploration of the prevalence and risk factors for depression in postpartum and non-postpartum women, which identified a high score on a life events scale devised by the researchers (which measured events similar to those explored in the current study) as being associated with postpartum depression (Eberhard-Gran et al. 2002; O'Connor et al. 2005b), and a study of the risks for postpartum depression in 594 Canadian women, which found that adverse life events in the last twelve months was predictive of postnatal depressive symptomatology, none of the other life stressors explored in the current study (divorce, death of a loved one, moving house or chronic illness in self or family) made a significant difference to postnatal depression scores. However, divorce has been found in another UK studies to be a significant predictor of depression (O'Connor et al. 2005b). As part of the Avon

Longitudinal Study of Parents and Children, O'Connor et al. (2005b) found that women experiencing a relationship separation displayed a significant increase in depressive symptoms, although the depressive symptoms were less for those women who were cohabiting than for those who were married. The current study did not make the distinction between being married or co-habiting and it is possible that the word 'divorce' prevented some women who had experienced a partner separation from responding to this question.

Perceived high levels of social support have been shown to enhance women's psychological wellbeing postpartum (O'Hara and Swain 1996; Morse et al. 2000). Similarly, perceived low levels of social support, especially emotional support from partners have been linked to postpartum depression (Lemola et al. 2007; Milgrom et al. 2008; Gremigni et al. 2011; Webster et al. 2011). The findings of this study in part support these observations as they demonstrate that women who did not perceive they had support emotionally from their partner in early pregnancy had a mean EPDS 3 score of 2.4 points higher than those experiencing support. In late pregnancy lack of practical support from a partner was significant in predicting the likelihood of postnatal depression.

In contrast to other studies (Webster et al. 2000; Castle et al. 2008; Spoozak et al. 2009) this current study also found that lack of practical and emotional support from family and friends were not significant predictors of depression postpartum. Social support is a complex area to explore, however, especially when it is measured as a perception by the recipient. Unlike this current study, an Australian study by Webster et al (2000), conducted to explore the relationship between the Maternity Social Support Scale and the EPDS, did not try to tease out the various dimensions of support such as emotional, instrumental and informational support, but rather considered it as a unidimensional perception of support from partner, family and friends. In contrast, in a study of 783 women in the United States, Spoozak et al. (2009), using the Kendler Social Support Interview (Kendler 2005) measured the quality of both emotional and instrumental support from partner, family (as defined

separately by mother, father and relatives) and friends. They concluded that it was the source from whence the support came that gauged its quality and strength, thus illustrating the importance of identifying separate support sources rather than generalising them all into 'family support'. As the current study did not use a recognised scale to measure support, and identified support as a dichotomous perception (practical and emotional), and family as unidimensional, comparisons with other studies are not easy to make.

Although lack of emotional support from a partner in early pregnancy was significant in predicting higher depression scores postnatally, single status and a poor partner relationship did not make a difference. However the question about partner relationship was asked with the first questionnaire at 13 weeks and it is possible that a woman's relationship might have improved or deteriorated, or indeed changed to a different partner, by six weeks postpartum, therefore this is not considered to be a reliable measure. Moreover it could be that women perceive emotional support as something distinct from the more complex issues involved in the whole relationship.

Contrary to the findings of other studies identified in meta-analyses (Beck 2001, Robertson et al. 2004) SES did not affect postnatal depression scores. Traditionally in the UK SES is measured using occupation coding (Meier and Moy 1999), although others may use broader classifications embracing income, education and occupation (Wang et al. 2010). In this study SES was determined by the occupation identified by the participants and was therefore open to a degree of interpretation during subsequent classification and coding. Information about income was not sought because it was considered intrusive; however, as many women described themselves as housewives, information relating to former occupation may have been helpful. Nevertheless the classifications do generally reflect the income of the family.

The findings therefore are also in contrast to other studies examining SES and depression in the general population, for example Lorant et al. (2007) who, in

their seven year longitudinal study of members of Belgian households over 16 years of age, found significant risks of women on low income developing depression, with depression worsening as socioeconomic circumstances worsened. In a multidisciplinary epidemiological health survey which looked at a population of 1,707 Finnish women between the ages of 30 and 64, depression, as measured on the BDI, was found to be twice as high among low income groups of women than high income groups (Virtanen et al. 2008) These studies involved a general population of women and therefore direct comparisons cannot be drawn between these groups and postnatal women. However, it is possible that SES did not make a significant difference to depression scores postnatally in the current study because of the transient nature of the family's economic status, if for example the woman would be returning to work after the birth. The findings do, however, confirm those of a meta-analysis of 57 international studies which found no relationship between SES and depressive symptoms postpartum (Lancaster et al. 2010).

Results showed that, after taking into consideration other recognised and established risk factors for depression, poor emotional processing was a strong predictor of depression, second only to early antenatal depression scores which might be expected to have the best predictive power. A woman who experienced poor emotional processing early in pregnancy might be expected to have on average a postnatal EPDS score of 0.6 higher than a woman who processed her emotions well. In late pregnancy emotional processing continued to make a unique contribution to the prediction of postnatal depression scores along with low self-esteem, general mental health, lack of practical support from a partner and change of job. After adjusting for all the other significant risks it was found that for every unit increase in emotional processing (worsening of processing) the average increase in mean EPDS 3 scores would be 0.8. This is a slightly greater increase than in early pregnancy suggesting that there would be value in measuring emotional processing in late pregnancy.

It was interesting to note that practical support rather than emotional support from a partner became a significant factor for postnatal depression alongside emotional processing in late pregnancy. Possibly by late pregnancy women had become more emotionally adjusted to their pregnancy but due to increasing tiredness and physical demands on their bodies they needed more practical support. Unlike other studies which show that poor support from family and friends was associated with greater symptoms of depression (Spoozak et al. 2009; Webster et al. 2010) these were not significant in predicting depression in this study.

Although the aim of the study was to determine whether emotional processing in early pregnancy would predict postnatal depression it was also interesting to compare its value with variables associated with birth outcomes, also identified as risk factors for postnatal depression in meta-analyses (O'Hara and Swain 1996; Beck 2001; Robertson et al. 2004). In agreement with these studies, obstetric factors such as dissatisfaction with the birth experience, physical pain postpartum and problems with infant feeding all significantly predicted higher EPDS scores postnatally along with emotional processing. This indicates that even after taking into consideration subsequent unsatisfactory birth outcomes poor emotional processing in early pregnancy will significantly predict high scores on the EPDS 3.

16.5 The prediction of postnatal depression from high EPS scores

Higher emotional processing scores significantly predict higher EPDS scores postpartum. Results also show that scores above the threshold on the EPS, indicating poor emotional processing, predict scores above the threshold on the EPDS, indicating the likelihood of postnatal depression. When the risk factors of physical and mental health, self-esteem, past history of depression, emotional support from partner, relationship with partner, new job and SES, measured in early pregnancy, were put into a regression model, poor emotional processing

was the strongest predictor of postnatal depression. When the events of birth were also taken into account poor emotional processing continued to predict postnatal depression, but dissatisfaction with the birth was a stronger predictive factor. This is valuable information when considering the management of postnatal depression as counselling or debriefing about birth events could perhaps also include a consideration of women's ability to manage their emotions.

The predictive value of emotional processing remained true providing antenatal depression scores in early pregnancy were not included in the regression model. After taking into account depression scores in early pregnancy high emotional processing scores did not predict postnatal depression, nor were any of the other identified risk factors significant with the exception of poor physical health. This indicates that although women with poor emotional processing will have significantly higher mean EPDS scores postpartum, poor emotional processing does not significantly predict postnatal depression has after taking into account antenatal depression scores in early in pregnancy. If antenatal depression scores are not included in the model then the presence of poor emotional processing will significantly predict postnatal depression.

Interestingly poor physical health in early pregnancy was significant in predicting postnatal depression alongside antenatal depression scores. A possible explanation for this may be that pain and depression may have a reciprocal relationship in that physical illness may cause or compound depression or alternatively depression may exaggerate pain and discomfort. This explanation is consistent with conclusions drawn by Brown and Lumley (2000) in their study of the relationship between physical health problems and depression postpartum where depression was thought to have contributed to a slower physical recovery, while at the same time physical health problems were likely to contribute to depression.

When antenatal risk factors were combined with risk factors surrounding the birth and postpartum (satisfaction with the birth, infant feeding problems, postpartum pain) the strength of early antenatal depression as a predictive factor for postnatal depression lessened, with dissatisfaction with the birth experience being stronger. Problems with feeding were also significant. It appears therefore that if a woman is depressed in early pregnancy, is physically unwell, has a poor birth experience and problems with feeding then these will contribute to postnatal depression regardless of how she manages her emotions.

When women experienced depression in late pregnancy, however, the results were quite different. In late pregnancy both poor emotional processing and antenatal depression significantly predicted postnatal depression, with poor emotional processing being a stronger predictor. None of the other recognised risk factors were significant, showing that after adjusting for the effects of depression in late pregnancy the odds of a woman with poor emotional processing developing postnatal depression were 3.5 times greater than a woman who managed her emotions well. When birth related variables were considered, poor emotional processing continued to have the strongest predictive value, followed by dissatisfaction with birth and late antenatal depression.

An understanding of the way in which a woman processes her emotions, therefore, appears to be key in the future planning and management of care for pregnant women. Knowledge of the role played by the processing of emotions at different stages in pregnancy and its interaction with other recognised risk factors can help practitioners to develop strategies to support women to understand and manage their emotions more effectively, contributing to improved emotional wellbeing and better outcomes postpartum. Strategies to facilitate the processing of emotions are discussed in the following chapter.

16.6 Limitations of the study

Several limitations of the study should be considered. The validity of the data presented and discussed is dependent on the accuracy of the responses given to the questions and how well they reflect the true feelings of the respondents. Bias may have arisen from methodological problems. These may include the wording of certain questions, data entry errors, missing data or data interpretation. Where possible however these were taken into account and have been explained in the presentation of the findings.

16.6.1 Representativeness of sample

It is difficult when conducting cohort studies to be sure of the representativeness of the remaining sample when large numbers drop out. Moreover, because it is not possible to determine who declined to participate in the first place it is impossible to be sure of whether the original sample was truly representative of the pregnant population. This lack of knowledge may weaken the results. However as discussed at the beginning of this chapter, despite age and SES appearing to affect subsequent participation, thus suggesting caution when interpreting results involving these statistics, the demographic results are comparable to UK national statistics provided for the general population of pregnant women in relation to postnatal depression figures, obstetric statistics and breastfeeding rates (Office for National Statistics 2001; Scottish Intercollegiate Guidelines Network 2002; Bolling et al. 2007; The Information Centre 2009, 2011) suggesting that results can be viewed with a degree of confidence. Moreover the sociodemographic data in the study are consistent with participants in other studies of postnatal depression which suggest that women are predominantly between 25 and 35 years of age and of middle to high socioeconomic status (Tammentie et al. 2002).

16.6.2 Missing and unclear responses

Measures were taken, and identified in the presentation of results, to try to take into account the effects of missing data, a common problem with the collection of longitudinal data. As expected with longitudinal studies women did not respond to all three questionnaires, thus resulting in a proportion of data missing. Moreover a small number of women missed out whole sections of the questionnaires. This occurred in five cases and would appear to be because two pages of the booklet were turned over at once rather than a deliberate action. On some occasions boxes were left blank and in these cases it was assumed that the response would be 'no'. For example women were asked to tick 'yes' or 'no' in response to whether they had experienced any of the identified life events. As a number of 'yes' boxes were ticked it seemed reasonable to assume that those left blank indicated a negative response. Again if the responses relating to current and past illnesses were left blank it was assumed that women had not experienced these. Women were asked in Q3 to tick any physical conditions that had caused them problems after the birth. In some cases all were left blank and although it is fair to assume that the respondents did not suffer any problems from the condition it might nevertheless have been helpful for clarity to have included an option 'none of these problems'.

In a small number of cases responses to the Likert-type scales were ambiguous with circles encompassing two boxes. Where this ambiguity was seen the response which included the largest part of the circle was taken. Where there was no discernable difference then the figure closest to the neutral response was recorded as there is a tendency for respondents to move towards the central more neutral response (Bowling 2000; Douglas et al. 2005).

Chapter 8 presented additional results emerging from linear mixed-effects modelling (mixed methods) undertaken to address the problem of missing data from unreturned questionnaires. The results were different from the original repeated measures ANOVA undertaken. For example ANOVA analysis applied to data collected at the three time points showed a marginally statistically

significant effect for time on the EPS and no effect for time on the EPDS scores, whereas mixed modelling identified significant changes over time. With repeated measures ANOVA participants were excluded if they did not provide data for each time point. To make correct inferences from such an analysis we need to assume that the data is missing "completely at random". A linear mixed-effects model estimates fixed and random effects together(Mcculloch and Searle 2000). In this analysis all data point are included, and a less stringent assumption is made about the missing data mechanism; that data is missing "completely at random" once other variables in the analysis have been taken into account. Thus with changing assumptions, the results of the test changed and showed significant changes over time in EPS and EPDS scores.

16.6.3 Length of questionnaire

A further possible limitation of the study may be the size of the questionnaire as a lengthy questionnaire can be a deterrent to completion (Denscombe 2004; Edwards et al. 2002). The basic rule of questionnaire design is to keep it short and succinct as data obtained from a lengthy questionnaire can be questionable due to questions being discarded before completion (Brett Davies 2007). Participants who completed the questionnaires in this study, however, appeared to have no problems with the length and all completed questions right to the end. The daunting task of completing further lengthy questionnaires cannot be discounted as a reason for non-return of subsequent questionnaires however. On reflection some aspects of the questionnaires may have been shortened such as omitting questions on life stressors from Q2 and Q3 as responses had been established in Q1 and were more relevant to early pregnancy than later.

16.6.4 Other risk factors

The consideration of risk factors was restricted to those identified in meta-analyses as consistently being associated with postnatal depression (O'Hara and Swain 1996; Beck 2001; Robertson et al. 2004). This may have limited the exploration of the predictive value of emotional processing. For example other studies have measured further key risk factors such as domestic abuse,

childhood abuse, drug and alcohol dependency and personality styles (Austin and Lumley 2003; Matthey et al. 2004). Although lack of information about the significance of these factors may reduce the applicability of the EPS to a more diverse population, it was felt that participants might consider questions relating to these factors intrusive and may not admit truthfully to them. These are, however, factors which might be considered in further research.

16.6.5 Distribution of scores

The distribution of scores for the measurement scales was skewed and this could be a further limitation to the study. EPS and EPDS scores were positively skewed indicating that more women had low scores (indicating good emotional processing and lack of depression) and SF-36 scores and RSE scores were negatively skewed indicating that more women had high scores (in other words good physical and mental health and high self-esteem. This was to be expected because of the measurements being taken. For example, there would be an expectation that a scale measuring postnatal depression, which has an incidence rate of 15%, would identify more participants at the positive end of the scale rather than produce a normal distribution curve with the same number of people on each side of the curve. This skewed distribution can cause problems with analysis when parametric tests require the data to be normally distributed and some caution should be applied when interpreting results. However, the techniques are robust when used on large samples (Field 2005), so for the purposes of this study assumptions were made that the data were distributed normally. As a precaution, however, non-parametric tests were also undertaken to confirm findings.

16.7 Strengths of the study

The study has a number of strengths. First of all, it contains a substantially large sample of women appropriate to achieve the aims of the study and a correspondingly large data set. When choosing sample size the advice given is to

recruit as large a sample as possible to make it more likely that real differences will be identified as statistically significant (Polit and Beck 2008). Even allowing for attrition the sample remained large enough to produce generalisable results. However, a large sample does not compensate for poor sampling methods (Polit and Beck 2008). In this study the exclusion criteria were minimal (women under 16 years of age and those unable to understand English) meaning that virtually all women attending antenatal clinic over a 14-month period were given an equal chance of taking part in the study. This strengthens the representativeness of the study and the generalisability of the findings to a wider population.

A further strength of the study is the use of well-known validated measurement tools which allow the reader to make comparisons with other international studies. Questionnaire design can be challenging and a number of pitfalls must be avoided in order to achieve the best results. Some problems may be assuring the validity of responses and ensuring that questions are neutral and do not provide value-laden responses (Rees 2011). The use of measurement tools containing questions that have been tried and tested on a number of populations helps to overcome this problem. In this study all of the measurement tools with the exception of the EPS had been validated for use with pregnant and postpartum women internationally and were therefore considered acceptable. The EPS, although not used before with pregnant women, has been validated for use with a number of nationalities and had been used with women of childbearing age.

It is essential that the reliability of a measurement tool is also strong. As the tools used in this study are widely used they all have demonstrable reliability scores which deem them acceptable for use with a pregnant population. Validity, which determines whether a tool actually measures what it is supposed to, is another essential element of any measurement tool (Hewitt-Taylor 2011). Again the use of the established measurement tools in this study in earlier studies confirms their internal (whether the outcomes are a valid interpretation

of events or whether they might be due to another reason) and external (how confidently the findings can be applied to other people and situations) validity.

The study also contributes new knowledge to the understanding of emotional wellbeing in pregnant and postpartum women and its association with perinatal mental health. This new understanding has important clinical implications which will be discussed in the following chapter.

Summary:

Results show that poor emotional processing is indeed a significant predictor of postnatal depression, suggesting that measurement of processing might help in the identification of this insidious condition. Higher scores on the EPS in early and late pregnancy predict higher scores on the EPDS postpartum indicating that women who have difficulty processing their emotions during pregnancy do appear to be at greater risk of developing postnatal depression.

An aim of the study was to determine whether poor emotional processing measured in early pregnancy would predict postnatal depression. Results have shown that in the absence of antenatal depression in early pregnancy in the regression model poor emotional processing will indeed predict postnatal depression. Additional analysis has shown that emotional processing in late pregnancy is also an excellent predictor of postnatal depression, even after adjusting for antenatal depression scores. These finding are very encouraging for the identification of women at risk of postnatal depression in the future.

It seems that, consistent with the literature, depression in pregnancy has a strong influence on postnatal depression. In early pregnancy it negates the influence of most other risk factors including poor emotional processing. However, regression modelling shows that in the absence of depression in early pregnancy in the model the presence of poor emotional processing will increase the odds of a woman developing postnatal depression. In late pregnancy, even

with antenatal depression in the model poor emotional processing is an excellent predictor of postnatal depression – although this might be expected because it is measured closer in time to the postnatal period. The findings suggest, however, that measurement of emotional processing in early pregnancy might prove valuable to practice, enabling the management of early intervention strategies.

17. IMPLICATIONS FOR PRACTICE

Introduction to chapter

Chapter 16 discussed the findings of this study and highlighted the important role that poor emotional processing plays alongside other known risk factors in the development of postnatal depression. Findings from the study have contributed to an understanding of the aetiology of postnatal depression and added another dimension to its construct. This new awareness is valuable for the planning of future strategies to promote early identification and appropriate support for women with emotional disturbances and to better inform and manage women's psychological and emotional health needs during and after pregnancy.

This chapter explores some of the ways in which this new knowledge might be applied to provide better support to women who have difficulty processing their emotions. The chapter discusses the value of screening or assessing poor emotional processing and ways in which this might be approached. It then goes on to explore support strategies that might be implemented within the existing framework of antenatal care to aid those women with disturbances in their emotional processing. The chapter concludes by suggesting further research that might be undertaken to enhance the understanding of women's emotional processing across the continuum of pregnancy, birth and the postnatal period.

17.1 Measuring emotional processing

Emotional processing has been shown in this study to be a significant predictor of postnatal depression. This could suggest that the emotional processing of all pregnant women should be assessed to enable professionals to provide timely intervention strategies as this could facilitate optimal psychological outcomes for

the woman and her family. The introduction of a universal health screening programme is a complex process, however, as there are a number of criteria that the programme must first meet including ensuring that the programme will not result in potential harm (Medical Research Council 2008; NSC 2011).

Screening is the process of identifying from an apparently healthy group of people those individuals who may be at increased risk of developing a particular condition (NSC 2000). The UK NSC provides criteria to be applied in appraising the appropriateness and effectiveness of a population screening programme(NSC 2011). One of these criteria is there should be evidence from randomised controlled trials (RCT) that have used the intervention that a proposed screening programme will reduce potential mortality and morbidity. Another criterion is that all other options for managing the condition and improving support have been considered and alternative cost effective interventions explored (NSC 2011). These criteria are in agreement with guidance provided by the Medical Research Council (MRC) for developing complex interventions which suggests that evidence of personal and cost effectiveness should be available from systematic reviews before an intervention is developed (MRC 2008).

Thus, despite the importance of the early recognition and management of perinatal mental health problems, bearing these criteria in mind it is clearly too soon, with such limited research into emotional processing during pregnancy and the postpartum period, to consider recommending a screening programme to detect poor emotional processing. A great deal more research is needed to investigate whether a screening intervention would prove socially, psychologically and economically effective and safe for the population of pregnant women in the UK.

Pregnant and postpartum women who experience poor emotional processing do not necessarily suffer from poor mental health and to initiate a screening programme might lead to the application of labels and associated stigma to a group of generally well women, making it less likely that they would discuss their

emotions openly. Nevertheless findings from this study have shown that knowledge of a woman's ability to manage her emotions might be valuable to professionals in providing appropriate support. As this is the case, it would still seem appropriate for midwives to find out about a woman's emotional processing as part of routine antenatal care in order to initiate timely supportive measures which might subsequently reduce the risks of postnatal depression. However it will be important to also consider and explore evidence of potential harm arising from such questioning.

A number of issues arise from this recommendation. These include the availability of resources and cost effectiveness of initiating this strategy, the acceptability of an 'emotions' assessment to women and the willingness of midwives to undertake it. There is also the issue of how appropriate referral and support could be accessed by the women and managed by the midwives.

17.2 Acceptability to women of emotional processing assessment

There has been much debate around the acceptability of assessing risks for postnatal depression, using a variety of tools, which might be relevant when considering the use of the EPS in clinical practice.

A small qualitative study undertaken in the UK to explore the acceptability of postnatal women being screened for depression using the EPDS found that just over half of the 39 women interviewed (n = 21) were concerned about the intrusive nature of the questions and the stigma attached to a high score, and would much prefer to talk about their emotional state rather than respond to an impersonal questionnaire (Shakespeare et al. 2003). Other reasons women gave for the unacceptability of screening were the inadequacy of their preparation and feedback from their screening, lack of time and the inappropriate environment in which some screening was undertaken (for example the baby clinic). Just under half of the women (n = 18), however, did welcome the

opportunity that completion of the questionnaire gave them to discuss their feelings more openly, but this was only apparent in women whose health visitor spent time with them afterwards reviewing their responses.

In contrast to the findings of Shakespeare et al. (2003) a much larger systematic review of 30 international studies which assessed the use of screening tools (including the EPDS), used to identify stress, anxiety and depression during pregnancy found that women were willing and relieved to respond to in-depth questioning about mental health when given the opportunity (Breedlove and Fryzelka 2011). This confirms earlier findings by Marcus et al. (2003) which revealed that 90% of 3,472 women approached to be screened for depression in a prenatal obstetric clinic in the United States agreed to participate. Again in support of these findings a grounded theory exploration of barriers and enablers to seeking help for postpartum mood disorders found that 10 Canadian women felt that routine screening for postpartum disorders would remove the stigma attached to a diagnosis of depression (Foulkes 2011). A similar positive theme around screening was found in a study by Armstrong and Small (2010) where a cohort of 230 Australian women was asked about their experiences of being screened for postnatal depression.

The aforementioned studies explored the acceptability of screening for depression during pregnancy, which could possibly explain the discrepancy in findings with the study by Shakespeare et al. (2003) which concentrated on postpartum screening. Antenatally women may have been motivated by the opportunity to discuss their feelings with a view to seeking support and resolution of them, whereas postpartum women may have been concerned by fears that their child might be taken away if they admitted to feelings which might indicate poor mothering skills (Shakespeare et al. 2003).

It seems likely from the evidence from depression screening therefore that a recommendation of emotional processing assessment using the EPS would be

acceptable to women in general, provided that appropriate processes were put in place to ensure women felt safe and supported to reveal their feelings.

17.3 Recommended processes to assess emotional processing

A UK review of tools and strategies to identify postnatal depression found that screening is acceptable to women and healthcare professionals provided all involved are forewarned about the process, and due consideration is given to when and where the assessment is delivered (Hewitt et al. 2009). Better training and attention to the process involved in undertaking the assessment have also been identified as measures which might help to increase the acceptability of screening to women (Shakespeare et al. 2003). If the EPS is to be administered to pregnant women therefore, due consideration must be given to preparation, timing and the processes involved to ensure that women feel confident and supported in completing the assessment.

17.3.1 The timing of assessment of emotional processing

In the current study, the EPS was administered to women who were attending the local NHS Trust's antenatal clinic for the routine nuchal translucency screening. As most women appeared in favour of completing the questionnaire at this time it seems reasonable to anticipate that this could be an appropriate time for the EPS to be administered to most women. The initial scores will provide midwives with an indication of women's emotional processing and optimise identification of those women who might be at greater risk of developing postnatal depression. This is important where midwives have limited access to specialist perinatal mental health advice and need to make initial decisions about women who may need further assessment.

Although women in the study appeared to manage their emotions better as pregnancy progressed, those who did not process their emotions well in later pregnancy appeared to be at greater risk of developing signs of postnatal

depression postpartum. Moreover poor emotional processing in both early and late pregnancy were significant predictors of depression postpartum. This suggests that assessment of emotional processing at two stages in pregnancy might be a valuable option. Although perhaps idealistic considering the stresses experienced by midwives with their the current workload, such assessment would not alter the pattern of current antenatal care provision if EPS measurements were undertaken at antenatal clinic, and it would identify women booking late and those developing difficulties managing their emotions as pregnancy progressed. This strategy would support the findings of a study of Australian women's views on antenatal assessment of risks for postnatal depression by Armstrong and Small (2010), which recommends screening at more than one time point in pregnancy to ensure that women are given flexible opportunities to disclose and discuss emotional health issues.

17.3.2 The role of the midwife and other professionals in assessing emotional processing

Midwives, as the major caregivers to women in pregnancy, would seem the most appropriate professionals to prepare women to complete the EPS and provide them with the opportunity to undertake the assessment. This will have clear implications in terms of preparation of midwives. Although the questionnaire is simple to follow and easy to administer and score it will be important to initiate training programmes to raise awareness of the role played by poor emotional processing in the development of postnatal depression.

There has been much discussion in relation to midwives' confidence in carrying out screening programmes, especially in relation to emotional and psychological health. Studies show that, although they perceive their role as embracing both psychological and physical wellbeing, midwives in general have less knowledge and awareness of psychological issues and feel less confident caring for depression than complex physical conditions (Tully et al. 2002; Jomeen et al. 2009; Foulkes 2011)

Although the establishment of a training programme might be demanding in terms of time and financial and manpower resources initially, the long-term outcomes for women and for the health services could be beneficial. Programmes that provide opportunities to professionals to learn how to deal with a range of psychological and emotional issues have been highly evaluated by professionals and women receiving subsequent care (Gunn et al. 2006; Hegarty et al. 2007). An evaluation of one such programme in Australia, which supported professionals to manage common issues such as depression, adverse life events, domestic abuse and partnership difficulties, showed that professionals felt more confident and competent in identifying and managing women with psychological issues, and women felt that midwives asked more appropriate questions after receiving training (Hegarty et al. 2007).

17.3.3 Resource implications of assessing emotional processing

To roll out a formal national screening programme for emotional processing is likely to have considerable cost/resource implications. Indeed a cost effectiveness analysis of the viability of routine postnatal depression screening in the UK found no proven benefits as against routine postnatal care (Paulden et al. 2010). Universal screening of emotional processing is likely to have a similarly unfavourable cost-benefit ratio, although data to inform a cost–effectiveness analysis were not collected as part of this study.

Undoubtedly there would be some costs in training midwives initially to raise awareness of emotional processing. However the introduction of a short questionnaire to be completed by women at routine antenatal visits could incur minimal costs, especially if subsequent support could be provided within existing antenatal provision, as recommended in the following section. However, there needs to be further consideration of cost effective ways of scoring the questionnaires, interpreting the data and feeding back the information to women.

17.4 Support to improve emotional processing

If emotional processing is to be assessed then there must be supportive measures put in place to enable women to understand and manage their emotions more effectively. In order to justify the assessment of emotional processing these strategies must be freely available to all.

17.4.1 Antenatal support groups

In recent years UK policy documents have highlighted the key role that antenatal education can play in the maintenance of good maternal health, confidence and self-efficacy (Department of Health 2004; NICE 2010). Although there is no evidence to suggest that participation in antenatal education classes prevents the onset of depression, antenatal groups that provide social support as well as preparation for birth and parenthood can be effective in improving the mood of women with sub-threshold symptoms of anxiety and depression (NICE 2010). A systematic review of international studies, which determined the benefits and cost-effectiveness of antenatal education, found some evidence that antenatal parenting support aimed at easing the transition to parenthood was effective in improving maternal psychological wellbeing (Shrader McMillan et al. 2009). The review concluded that although most women seek emotional and practical support from family and friends, interaction and learning with other expectant mothers was highly valued and helped them to make more sense of the emotional as well as the physical changes they were undergoing (Shrader McMillan et al. 2009).

It would seem, therefore, that valuable support for women who have difficulty processing their emotions might be gained from antenatal groups. Interaction with peers and the provision of focused antenatal education might help women to understand and mange their emotions more effectively, reducing the feelings that could subsequently lead to depression postpartum.

The approach to antenatal education in England is currently being reconsidered and re-planned following two 'Birth and Beyond' reports commissioned by the Department of Health to review the current provision of antenatal education and explore the views of stakeholders (Barlow et al. 2009; Shrader McMillan et al. 2009). As a result of these findings new strategies for the delivery of antenatal support and education are being planned, linked to a number of government's policies. Such policies are 'Supporting Families in the Foundation Years' which is committed to giving every child a fair start in life (Department for Education 2011), and the Healthy Child Programme which supports local authorities to provide appropriate support to families throughout pregnancy and childhood (Schribman and Billingham 2009). The provision of an integrated service will be made by multiagency teams where midwives will work closely with health visitors, family nurses and other associated professionals within the non-medicalised, accessible and family friendly environment of Sure Start and Children's Centres (Schribman and Billingham 2009).

As part of its coordinated strategy the Healthy Child Programme recommends local antenatal groups held in community settings to cover among other things psychological issues, relationship matters, preparation for new roles and problem solving skills (Schribman and Billingham 2009). For women who suffer from anxiety or depression for the first time the progressive strategy recommended by the Healthy Child Programme includes group based activities exploring self-help materials or assisted self-help such as computerised cognitive behavioural therapy. The opportunity for women to explore and discuss their feelings and discover how to process their emotions more efficiently would fit in well within this environment.

Women have discussed the importance of feeling safe enough to have a dialogue about their emotional and psychological needs without any stigma attached (Foulkes 2011). Antenatal groups might provide that safe environment. As results showed, the highest scoring of all the subscales was 'unprocessed emotions', which indicates that many women had a great number of emotions to

manage during their pregnancy. The opportunity to talk to their peers in groups and express those emotions might prove helpful to some of these women. Moreover peer support has been shown to help women adjust to emotional difficulties (NICE 2010) so for those single women especially and those in poor relationships who do less well psychologically, are more depressed have lower self-esteem and greater difficulty processing emotions, support from other pregnant women could be vital in aiding their emotional wellbeing. 'Suppression of emotions' and 'unregulated emotions' significantly predicted postnatal depression. Antenatal support groups might be valuable in giving these women the opportunity to express their emotions in a safe and controlled environment.

Within the framework of the proposed new antenatal support programmes suggested by government policies specialist antenatal groups will be established to support the needs of vulnerable groups such as teenagers (Department of Health 2004; Schribman and Billingham 2009; Department of Health 2011). Within such groups, younger women, who were shown in this current study to have greater difficulty processing their emotions than older women, might find greater opportunities to discuss their feelings with peers. The chance to talk to others of the same age, in the same situation, might help those who had impoverished emotions and difficulty processing their emotions, which were among the highest scoring sub-scales for young women in the study.

As part of new Government strategies planned to support expectant and new mothers, more intensive plans have been made for women at higher risk such as adolescents and those with more serious mental illnesses. One associated programme that younger women might benefit from is the Family Nurse Partnership (FNP) programme (Department of Health 2011). The FNP is an innovative approach to supporting vulnerable young primiparous women, which offers intensive structured home visiting from early pregnancy (ideally before 17 weeks) to two years postpartum and a programme of learning about relationships, attachment and psychological preparation for parenthood, aimed

at tackling emotional problems, improving pregnancy outcomes for the mother and baby, increasing self-efficacy and economic self-sufficiency and improving child developmental outcomes (Department of Health 2011). The programme began in the United States and was initially piloted in ten sites in the UK to evaluate its effectiveness, measurement outcomes including smoking during pregnancy, breastfeeding, further pregnancies and child development at age two (Department of Health 2011). Early evaluation has demonstrated some success in the first three years of the project (Institute for the Study of Children, Families and Social Issues 2011), although more detailed analysis of resource implications and effectiveness in comparison with other services will be available from the results of a randomised control trial in 18 sites which will report in 2013. For younger women, however, who have been shown by this current study to have greater difficulty processing their emotions and to be more vulnerable to psychological and emotional health problems and depression the FNP programme might provide them with opportunities to gain the insight and understanding of their emotions that they need to manage them more effectively. Indeed an emotional processing assessment and management schedule could be embraced well within the structure of the FNP programme.

The value of integrating emotional processing support into current and proposed antenatal programmes is that it can potentially reach all women. Children's Centres will be the hub of all antenatal routine care and support and therefore arguably, if the majority of women were to access the programmes on offer and discussion of emotions became a routine element of the programme, then women would gain insight into their emotions whether or not they were identified prior to that as having difficulties processing their emotions. It might not therefore be necessary to measure the emotional processing of all women, but rather selective assessment might be offered to those women who appear from discussion groups to be having greater emotional difficulties than others. Such a suggestion would, however, rely on the skill of staff recognising the emotional needs of some women and thus may be subject to bias. Therefore, although selective screening would remove not only the cost and time of

delivering an assessment programme to all but more importantly any psychological and cost implications surrounding false positive results, simple screening of all women might be more appropriate.

17.4.2 Psychological therapies

For women with severe symptoms of depression NICE recommends more specific treatments such as interpersonal behavioural therapy or psychotherapy rather than psychosocial interventions (NICE 2007). For those women who have additional psychological issues as well as difficulty processing their emotions specific psychological therapies to strengthen emotional processing might be developed.

Cognitive Behavioural Therapy (CBT) has been shown to improve emotional processing in a group of patients undergoing CBT after they received the treatment (Baker et al. 2011). This suggests that although CBT is a therapy designed to relieve psychiatric symptoms, it may also facilitate the processing of emotions (Baker et al. 2011). This knowledge might be helpful in the future in designing therapies to assist women with more serious and complex emotional processing difficulties. Indeed, the Healthy Child Programme recommends brief psychological treatments such as CBT for those women with current or previous episodes of non clinical depression and anxiety (Schribman and Billingham 2009) and it would seem appropriate that women with emotional processing difficulties be embraced within this support mechanism. Such strategies would necessarily need to become part of an interprofessional plan of care with appropriate referral pathways identified.

17.4.3 Timing of support

The value of embracing support to enable women to recognise and manage their emotions more effectively within a developing programme for antenatal education allows wider opportunity for women to access such services. Future antenatal support and education will be provided across the course of pregnancy rather than being focussed on a short period of time before the birth which was

traditionally when classes were held (Nolan 1998). Integration of support to manage emotional processing into this programme will provide women with the opportunity to explore emotions early in pregnancy, when, as the current study shows, women generally have greater difficulty managing their emotions. Later in pregnancy emotions management strategies will address the needs of those women with higher emotional processing scores who might significantly develop depression postpartum. The opportunity to explore and understand feelings at varying times during the antenatal period therefore would be valuable to women in helping them to process their changing emotions during this time.

The landscape of postnatal care in the UK is changing with very early discharge from hospital becoming the norm both nationally and internationally and no commensurate arrangements being made to increase community care provision (Shaw et al. 2006). Women are increasingly having less direct contact with midwives and much greater contact with maternity support workers (Redshaw and Heikkila 2010; Griffin 2011). This reduction in postnatal care will inevitably impact on opportunities to assess women's emotional wellbeing at this time.

It therefore becomes more essential to ensure that the emotional processing of women is assessed during pregnancy and women are given the opportunity to learn and understand how to process their emotions more efficiently at this time, when contact with the midwife is greater, with the aim of reducing the risks of postnatal depression developing. During the postpartum period women who access antenatal support and education through Children's Centres can continue with the collaborative working and supportive networks established at this time more effectively.

17.5 Future research

This was the first study to explore the emotional processing of women during pregnancy and postpartum. Before comprehensive recommendations can be

made regarding how this new understanding of emotional processing might be used most effectively in clinical practice to optimise outcomes for women and their families further quantitative and qualitative research must be undertaken.

RCTs should be undertaken to assess whether intervention strategies adopted are successful in reducing the incidence of depression. Findings will determine what support programmes are most effective in improving women's ability to manage their emotions. Moreover, if evidence emerges from controlled trials that a screening programme for emotional processing, embracing supportive strategies, is effective in reducing postnatal depression, then weight will be added to a call for a national screening programme.

Although this study has identified the risks of women with high emotional processing scores developing postnatal depression, further evidence must be gathered regarding the effectiveness of the EPS in identifying actual cases of postnatal depression. This must be done using recognised diagnostic criteria such as the clinical interview and the DSM-IV (American Psychiatric Association 1994).

The acceptability to women of being screened for deficits in emotional processing has been assumed in these recommendations, based on evidence from earlier studies of the acceptability of depression screening and the willingness of women in this current study to participate in assessment. However, further qualitative research must be undertaken into women's views of completing the EPS. With this knowledge the process and administration of the tool can be refined. Moreover the acceptability to women of subsequent intervention strategies undertaken must also be assessed.

A key question to consider when developing an intervention strategy is its practical effectiveness (Medical Research Council 2008). The views of strategic planners, midwives and other professionals involved in assessing emotional

processing must also be sought to ensure that an intervention that works in everyday professional practice is developed.

Summary

The EPS provides midwives with a set of straightforward, understandable self report questions that can easily be administered to women in a clinic setting and has the potential to optimise early detection of those at risk of developing postnatal depression. Used in conjunction with supportive measures provided by antenatal groups it might help initiate prophylactic measures which will reduce the likelihood of subsequent postnatal depression.

Strategies necessary to support women to manage their emotions more effectively do not need to put an excessive demand on already challenged resources and budgets. Future research into emotional processing might suggest more structured screening programmes supported by specifically designed strategies for help, but currently much of the support identified can be accessed and delivered through already existing or planned programmes to support pregnant women and their families during pregnancy and in their preparation for parenthood.

18. CONCLUSION

Findings from this study of emotional processing in childbirth have provided a body of knowledge in an area that has been commented on frequently in the literature but until now unexplored in depth. The study has revealed a great deal of information about women's emotions in pregnancy and postpartum and how these interact with other psychological, physical and sociological variables to promote or impede the overall wellbeing of the mother.

The findings of this study have reinforced those of earlier studies of perinatal mental health. They have shown, for example, that antenatal depression is as great a problem when considering women's wellbeing as postnatal depression (Evans et al. 2001; Josefsson et al. 2001; Bunevicius et al. 2009). In fact higher percentages of antenatal depression were revealed in this current study, even when taking into account the varying tools and thresholds used to measure depression. Also consistent with earlier literature (O'Hara and Swain 1996; Beck and Gable 2001; Robertson et al. 2004; Milgrom et al. 2008), this study revealed that women with a history of depression or anxiety or those reporting a past episode of postnatal depression and those with a family history of depression had worse general mental health and displayed a greater likelihood of developing depression during pregnancy and postpartum. Other risk factors for postnatal depression found to be consistent with earlier studies were younger age and a lack of regular partner support. As with other studies (O'Hara and Swain 1996; Beck and Gable 2001; Robertson et al. 2004; Milgrom et al. 2008), parity and SES appeared to make no difference to the development of postnatal depression.

The study has added valuable information to the body of knowledge about emotions experienced by women during pregnancy and postpartum. It has

shown that parity and physical health did not appear to make a difference to the processing of emotions. However, women of a younger age, those who were single, of lower SES and those who had a current or past history of psychological disorders or postnatal depression appeared to be more vulnerable and had greater problems in processing the range of emotions experienced.

The study aimed to test the hypothesis that women who had difficulty processing their emotions during pregnancy would be more likely to develop postnatal depression. It also hoped to show that postnatal depression could be predicted from scores on the EPS. Results suggest that these hypotheses are true and demonstrate that there were strong associations between poor emotional processing and the likelihood of postnatal depression occurring. In fact the difference in mean EPS scores in early pregnancy (1.8) and in late pregnancy (2.2) between women who had high and low EPDS scores postnatally were greater than the 0.6 anticipated at the outset of the study.

The predictive power of the EPS has also been demonstrated by the multiple and logistic regression models built. Results of multiple regression analysis showed that, after adjusting for other recognised and established risk factors for depression identified in the literature (O'Hara and Swain 1996; Beck and Gable 2001; Robertson et al. 2004; Milgrom et al. 2008), poor emotional processing in early pregnancy made a strong unique contribution to the prediction of postnatal depression, even with the presence of early antenatal depression in the model, with one unit rise in the EPS 1 score predicting a corresponding rise of 0.6 in the EPDS score postnatally. Consistent with the literature, however, depression in pregnancy had a strong influence on postnatal depression, and depression in late pregnancy negated the predictive power of poor emotional processing. However if depression scores in late pregnancy wre not included in the model poor emotional processing made the strongest unique contribution to the prediction of postnatal depression, after adjusting for all other recognised risk factors.

The results of the logistic regression analyses, which estimated the odds ratio of women developing postnatal depression if they had high scores on the EPS, indicating poor emotional processing, demonstrated that the odds of a woman with a high EPS score in early pregnancy having depression postpartum were 2.5 times higher than for a woman with low EPS scores. However, although higher EPS scores in early pregnancy predicted higher EPDS postpartum, even when early antenatal depression scores were present in the model, high EPS scores (that is above the threshold of 4.6) did not significantly predict the odds of a woman having high scores on the EPDS (that is 13 and above) postpartum. However, in late pregnancy, even after adjusting for depression scores, the odds of a woman with high emotional processing scores developing postnatal depression were 3.4 times higher than a woman with low EPS scores. These findings demonstrate not only the role that emotional processing plays when interacting with other risk factors but also the importance to clinical practice of being aware of women's emotions at all times during pregnancy.

The findings of the study point to a need for professionals to have a greater understanding of the concept of emotional processing. This understanding will enable them to provide appropriate support to women to help them to manage their emotions more effectively. A number of suggestions have been made in this work to facilitate the integration of a supportive structure of emotion management into the existing framework of antenatal care, enabling the strategy to be undertaken in a resource-efficient and less time-threatening way. There appear to be many occasions within current and proposed plans for antenatal care (embracing Children's Centres as the focal point of care, the Healthy Child Programme, the FNP Programme) to provide women and professionals with opportunities to establish programmes of emotional exploration and support within an environment that will be safe and non-threatening to women. Integration of emotional processing support into developing antenatal programmes will mean that help will be available to all women.

The complex nature of women's emotional and psychological wellbeing has been demonstrated clearly by this study. It suggests that a clear understanding of the way in which a woman processes the sometimes complex array of emotions experienced during pregnancy and postpartum, and the impact this management has on many aspects of her physical and psychological wellbeing are key to future planning strategies and the management of care for all pregnant women.

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APPENDICES

Appendix 1. Literature searches

1.1 Initial literature review

This appendix provides details of the initial review of the literature undertaken at the beginning of the study.

Search parameters: Publication date from 1996 to 2006

Topic area	Key word(s) or phrases searched	Total number of hits
Perinatal mental health	Postnatal depression	5005
	Postnatal anxiety	178
	Postpartum depression	9015
	Postpartum anxiety	294
	Antenatal depression	280
	Antenatal anxiety	109
	Antepartum depression	43
	Antepartum anxiety	2
	Perinatal depression	438
	Perinatal anxiety	83
Incidence and prevalence	(Incidence and antenatal or postnatal depression)	5214
	(Incidence and postnatal depression)	158
	(Incidence and antenatal depression)	16
	(Prevalence and antenatal or postnatal depression)	5227

	(Prevalence and antenatal depression)	39
	(Prevalence and postnatal depression)	495
Risk factors	Risk factors and antenatal or postnatal depression	5256
	Risk factors and antenatal depression	76
	Risk factors and postnatal depression	650
Effects on fetus /offspring	Anxiety or depression and f*tus	319310
	Antenatal anxiety and effects and f*tus	23
	Depression and f*tus	1089
	Antenatal depression and effects and f*tus	8
	Maternal depression and effects and infant*	565
	Maternal anxiety and effects and infant*	132
	Antenatal depression and postnatal depression and effects and infant*	17
	Maternal depression and effects and child*	1184
	Postnatal depression and effects and child*	381
	Antenatal depression and postnatal depression and effects and child*	26
	Maternal anxiety and effects and child*	265
	Maternal depression and effects and adolescent*	234
	Antenatal depression and postnatal depression and effects and adolescent	8
	Maternal anxiety and effects and adolescent*	81
Screening and tools	Screening for postnatal depression	256
	Antenatal screening for postnatal depression	14
	Screening tools for postnatal or postpartum depression	9255
	Screening tools for postnatal depression	36
	Screening tools for postpartum depression	17

	Edinburgh Postnatal Depression Scale	1973
	SF-36	25468
	Rosenberg Self Esteem Scale	3044
Emotions	Emotional Processing	8817
	Control of emotions	5225
	Emotion* in pregnancy	125
	Emotion* experience in pregnancy	67
	Emotion* awareness	2398
	Emotion* expression	13716
	Emotion* intelligence	9470

1.2 Key words and phrases used in search

Key words for search of perinatal mental health		
Perinatal mental health	Incidence	Effects on fetus (f*tus)
Antenatal mental health	Prevalence	Effects on infant or child*
Antenatal anxiety	Risk factors	Effects on adolescents or teenagers
Antenatal depression		Infant or child development
Postnatal mental health		
Postnatal anxiety		
Key words for search of screening		
Edinburgh Postnatal Depression Scale or EPDS		Screening tools
Edinburgh Depression Scale or EDS		Detection
Hospital Anxiety and Depression Scale or HADS		Prediction and predictors (predict*)
Beck Depression Inventory or BDI		Thresholds
Short Form 36 or SF – 36		Cut-offs
Rosenberg Self-Esteem Scale or RSE		Screening guid*
Key words for search of emotional processing		
Emotion*		Control
Mood		Expression
Emotional awareness		Experience
Emotional intelligence		Processing

Appendix 2. Recruitment documentation

2.1 Letter of invitation

Trust headed paper

Emotional Processing In Childbirth (EPIC) Study.

A study of women's emotional wellbeing during pregnancy and the early weeks after birth and their risks of developing postnatal depression.

Dear Mother-to-be

Congratulations on your pregnancy.

I would like to invite you to take part in a research study I am undertaking among pregnant women in the North Hampshire area. The study is trying to discover whether there is a relationship between the way women cope with emotional or stressful events in their lives and the development of postnatal depression. Your participation will involve you completing three questionnaires.

If you agree to participate I (or my research colleague) will give you your first questionnaire when you attend antenatal clinic for your first scan at around 12 weeks. You may complete and hand in the questionnaire during your visit to clinic or return it later in a pre-paid envelope. The questionnaire will take approximately 15 minutes to complete. I will post the second questionnaire to you when you are 34 weeks pregnant and the third one six weeks after you have had your baby.

I hope that the information we gather from the completed questionnaires will assist midwives and other health care professionals to identify more quickly women who might develop postnatal depression and thus help us to plan support that will limit the potentially distressing results of depression for women and their families.

All the information I obtain from the questionnaires will remain strictly confidential.

If you are interested in taking part please read the attached information sheet carefully for more details. Please bring the sheet and the enclosed consent form with you when you attend clinic.

I look forward to meeting you.

Yours sincerely,

Carol Wilkins
Registered Midwife and Midwifery Lecturer
Tel: 023 9228 6000 Ext 4630
E-mail: cwilkins@bournemouth.ac.uk

2.2 Participant Information Sheet

Trust headed paper

PARTICIPANT INFORMATION SHEET

Emotional **P**rocessing **I**n **C**hildbirth

EPIC Study

A study of women's emotional wellbeing during pregnancy and the early weeks after birth and their risks of developing postnatal depression or other psychological problems.

You are being invited to take part in the above research study. The study is being undertaken by Carol Wilkins, a registered midwife, lecturer and PhD student at Bournemouth University.

Before you decide whether you wish to take part it is important for you to understand why the research is being done and what it will involve. Please take the time to read the following information carefully. You may wish to talk to your family and others about it or you may contact the researcher for further information.

Part 1 of this leaflet tells you the purpose of this study and what will happen if you decide to take part.

Part 2 of the leaflet gives you more detailed information about the way the study will be conducted.

Part 1

The aim of the study:

The aim of the study is to discover whether there are any relationships between the way women manage and cope with emotional or stressful events occurring in their lives and the development of postnatal depression or any other emotional difficulties after childbirth.

Approximately 15% of all women having a baby will develop depression. Postnatal depression is a disturbing event that affects both the mother and her family. Some mothers and their babies may miss out on the benefits of early bonding and it is possible that some babies of mothers suffering from depression may display behavioural problems as they grow up.

It is therefore important for women, their partners, their families, midwives and other health professionals to be able to identify the signs and symptoms of postnatal depression and act quickly to ensure the woman receives support and care to limit the effects. It will be even more helpful if those women who may have an increased risk of developing depression can be identified in pregnancy so that measures can be taken to support the woman and her family and potentially avoid the disabling effects of depression.

The aim of this study is to see if there is a connection between the development of postnatal depression and the way a woman copes with stressful events happening in her life. People cope with stress in different ways. Emotional processing describes how we cope with the feelings we get when unpleasant things happen to us. If we are successful in processing our emotions it means that we are able to understand why we feel the way we do about events and we are able to get on with things without always thinking of what happened. If we are unable to deal properly with our feelings, we may find that we avoid doing things or going to places that remind us of the unpleasant event.

Recent studies of people suffering from illnesses such as irritable bowel syndrome (IBS), bowel cancer, chronic pain, depression and anxiety have found that symptoms of the illness appear to be experienced more strongly by those who have difficulty in processing their emotions As pregnancy and childbirth is undoubtedly a major life changing event which can cause stress and anxiety to many women it seems reasonable to investigate whether there is also a relationship between how women cope with their emotions during their pregnancy and whether they subsequently develop postnatal depression. Knowledge of this will help the emotional wellbeing of women giving birth in the future

Why have I been chosen?

You have been chosen to take part in this study because you have recently become pregnant. Approximately 600 women are required to take part and all English speaking women over the age of 16 years attending this antenatal clinic from the time the study begins will be invited to take part until desired numbers are reached.

Do I have to take part?

No. It is up to you to decide whether or not to take part.

This information leaflet is yours to keep and if you do decide to take part you will be asked to sign a consent form when you attend clinic.

You will be free to withdraw from the study at any time without giving a reason.

If you decide to withdraw or if you decide not to take part at all this will not affect the standard of the maternity care you receive.

What will happen to me if I take part?

If you decide to take part you will be asked to complete three questionnaires during the course of your pregnancy and after the birth of your baby.

- **Questionnaire 1**: You will be given this when you attend antenatal clinic for your first scan at 11 weeks. The researcher hopes to meet you in person at this time to explain the study in more detail. You may fill this questionnaire in at clinic or, if you wish, you make take it home and return it later in a pre-paid envelope which will be provided.

  The questionnaire will ask for some basic details about you together with questions relating to your feelings and how you cope with them. Most of the questions will require you to tick a box, although there will be some opportunity for you to comment further if you wish. The questionnaire should take approximately 15 minutes to complete.

  If you do not see the researcher at clinic but still wish to take part then you may leave your contact details with the receptionist and the researcher will contact you as soon as possible.

- **Questionnaire 2:** You will be sent a shorter version of the questionnaire by post when you are 34 weeks pregnant. You will be given a stamped addressed envelope to return the completed questionnaire to the researcher.

- **Questionnaire 3:** Six weeks after you have given birth to your baby you will be sent a third questionnaire. This will contain the same basic questions as the first two, but there will be some additional questions relating to your birth experience.

Completion of these questionnaires will not involve you in any extra visits or expenditure.

What are the possible benefits of taking part?

Taking part in this study may not help you directly during this pregnancy, although thinking about things may help you to understand your feelings better. Your answers to the questions, however, will provide valuable information that will enable us to understand more about how a woman's emotions affect her childbirth experience. They will help us to identify means of providing support for

women who have difficulty coping with emotions or who are at risk of developing postnatal depression.

Will I be affected in any way by taking part in the study?

Most people are not affected by completing questionnaires. It is possible that answering questions about your feelings may cause you to think again about events that have happened or you may realise that you have been experiencing low moods. Or it may be that you have a pre-existing or past psychological disorder that you are reminded of when answering these questions. In these cases you may wish to speak to someone in more detail about these feelings, for example your midwife, health visitor or GP. Details of people and agencies you may contact can be found at the end of this information sheet.

What if there is a problem?

If you have a complaint about the way you have been dealt with during the course of the study this will be addressed. Detailed information can be found in Part 2

Will my taking part in this research be kept confidential?

Yes. All the information about your participation will be kept confidential. Further details can be found in Part 2.

Contact details:

If you require any further information or wish to discuss the study further you may contact the researcher (see below):

Researcher: **Carol Wilkins**

School of Health and Social Care
Bournemouth University,
Eastern Campus
Finchdean House,
St Mary's Hospital,
Milton Road,
Portsmouth,
PO3 6AD.

Tel: 023 9228 6000 Ext 4630
E-mail: cwilkins@bournemouth.ac.uk

If you wish further details about the sponsorship of the study by Bournemouth University you may contact the research supervisors (see below):

Supervisors: **Professor Peter Thomas**
Professor Roger Baker

Dorset Research and Development Support Unit
Tel: 01202 448489

Professor Debra Bick

Centre for Research in Midwifery and Childbirth
Faculty of Health and Human Sciences
Thames Valley University
E-mail: debra.bick@tvu.ac.uk

This completes Part 1 of the Information Sheet. If you are interested in taking part in the study please continue to read the information in Part 2 before making a decision.

Part 2

What will happen if I don't wish to carry on with the study?

If you decide to withdraw from the study we may still use data gathered to that point. If you are not happy for this to happen and wish the data to be destroyed you must inform the researcher of your wishes.

What if there is a problem?

If you have a concern about how you have been treated during the process of completing the questionnaires you may contact the researcher and she will try to resolve the problem.

If you do not wish to speak to the researcher you may contact any of the supervisors who will do their best to answer your concerns.

You may also contact the following local services:

The Research and Development Manager: 01256 360452
Email katy.o'donnell@bnhft.nhs.uk

The Patient Advisory Liaison Service (PALS): 01256 486766
Email pals@bnhft.nhs.uk.

If you remain unhappy and wish to complain formally you can do this through the NHS Complaints Procedure: 01256 486767
Email andy.gaff@bnhft.nhs.uk

Arrangements for potential compensation for any liability arising as a result of the study have been undertaken by the research sponsor, Bournemouth University.

Will my taking part in the study be kept confidential?

All information which is collected from you during the course of the research will be kept strictly confidential and managed in accordance with the Data Protection Act 1998.

Questionnaires will be coded. Only the researcher will hold information linking the code number with your personal details. Your personal details will be stored in a locked drawer, to which only the researcher has a key, in a separate location from the completed questionnaires.

The supervisors will have access to the data obtained from the questionnaires but they will not be able to identify you from this information.

You will not be able to be identified in any published findings.

Following completion of the study the information will be stored for 5 years after which time it will disposed of securely.

Local GP practices have been informed that the study is taking place.

What happens to the results of the research study?

The answers to the questionnaires will be analysed statistically and conclusions will be reached.

The findings will be published in journals relating to midwifery and psychology and shared at conferences with other midwives and health care professionals. The process of analysis may also be shared with student midwives to assist with their professional development.
A summary sheet of the findings will be sent you on completion of the study and the outcomes will also be shared with antenatal and postnatal support groups.

Who is organising and funding the research?

The researcher is organising the research to meet the requirements of her doctoral studies being undertaken at Bournemouth University. She is being supervised by Professor Peter Thomas of Bournemouth University and the Dorset Research and Development Support Unit, Professor Debra Bick of Thames Valley University and Professor Roger Baker of the Dorset Research and Development Support Unit.

The researcher's employer, Bournemouth University, is funding the course and the researcher is funding the day to day costs of the study herself.
Who has reviewed the study?

The study has been reviewed and approved by the Southampton and South West Hampshire Research Ethics Committee B.

Thank you for taking the time to read this information sheet.

This information sheet is yours to keep. If you choose to take part in the study you will be asked to sign a consent form when you attend your first antenatal clinic appointment.

Your contribution to the study will be very valuable.

****If you have any concerns about your physical or emotional health at any time please contact your midwife, GP or other relevant health professional.**

Useful Information and Contacts:

Your Community Midwife ……

Your GP…….

Your Health Visitor ……

ANTENATAL INFORMATION AND SUPPORT:

Depression in Pregnancy Information
PO Box 1144, Bedford, MK42 7ZH
www.depression-in-pregnancy.org.uk

Babyworld
A website providing advice, information and the opportunity to discuss pregnancy, birth and parenthood.
www.babyworld.co.uk/information/pregnancy/health/emotions/antenataldepression1.asp

POSTNATAL INFORMATION AND SUPPORT:

The Association for Postnatal Illness
145 Dawes Road, Fulham, London, SW6 7EB
Tel: 020 7386 0868
www.apni.org
Aims to help women who suffer from postnatal depression. Volunteers provide postal, telephone or e-mail support.

Meet-a-Mum Association
Helpline: 0845 120 3746 (7pm-10pm weekdays only)
Services include advice and support for mothers with postnatal depression. MAMA encourages the establishment of local support groups.
– http://www.mama.org.uk

Netmums
Netmums is a family of local websites maintained by a local mother. It provides information about local and national support for postnatal depression and anxiety. Membership of your local North Hants branch is free.
www.netmums.com

Birth Reflections
Support service offered to women postnatally by Basingstoke Midwifery Team. Further details are available from Maternity Reception on 01256 313328

ANTENATAL AND POSTNATAL INFORMATION AND SUPPORT:

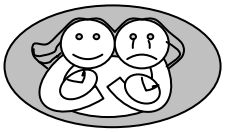
Perinatal Illness UK
PO Box 49769, London, WC1H 9WH.
www.pni-uk.com

Emotional Processing website
Provides information about emotions and emotional processing and contains an article about emotional processing and childbirth.
www.emotionalprocessing.org.uk

2.3 Consent Form

Trust headed paper

PARTICIPANT CONSENT FORM

	**E**motional **P**rocessing **I**n **C**hildbirth

EPIC Study
A study of women's emotional wellbeing during pregnancy and the early weeks after birth and their risks of developing postnatal depression or other psychological problems.

Please initial box

1. I confirm that I have read and understood the information sheet for the above study (version …., date…….) and have had the opportunity to ask questions and have these answered satisfactorily. ☐

2. I understand that my participation in the study is voluntary and that I am free to withdraw at any time without giving any reason and without my subsequent care being affected. ☐

3. I understand that all responses and information gathered from the questionnaires that I complete during the course of the study will be made anonymous. ☐

4. I agree that any words I use as further comments in the questionnaires may be quoted in the final report of the study. I understand that these quotes will be made anonymous. ☐

5. I agree to take part in the above study. ☐

Name of participant ……..

Signature ……. Date ……..

Name of researcher ……..

Signature ……. Date ……

2.4 Recruitment in absence of researcher

Recruitment to the EPIC study

I am recruiting women attending for nuchal translucency screening or dating scans (i.e. 13 weeks gestation) for my study.

All women sent appointments for nuchal translucency screening or dating scans have had information about the study included in their appointment letters.

There are occasions when I am unable to attend antenatal clinic. If in my absence a woman approaches you expressing interest in taking part in the study I would be very grateful if you would ask her to complete the attached card with her contact details and assure her that I will send a questionnaire to her together with a stamped addressed envelope for return or provide further information if she requires it.

Cards can be placed in the plastic box on the desk.

Many thanks for your support

Carol

We are sorry that the researchers are unable to attend clinic today.

If you wish to take part in the EPIC study, please complete your details below and we will send you a questionnaire:

Name ……

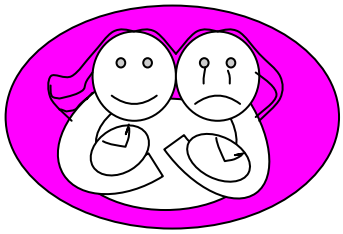
Address …….

……

……

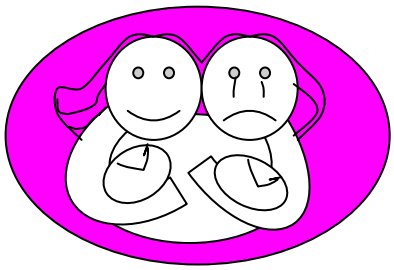
Telephone number ……..

Date baby due ……..



The EPIC Study

2.5 EPIC identification logo



The logo was designed to be easily seen and recognised by women and professionals.

The two faces represent the opposing emotions of happiness and sadness

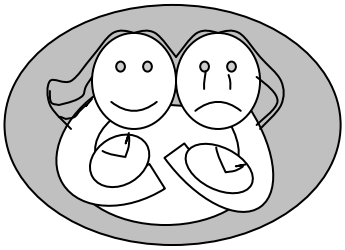
Appendix 3. The questionnaires

NB. Permission has been granted by Professor Roger Baker of Bournemouth University Clinical Research Unit and the Medical Outcomes Trust and Quality Metric Incorporated to reproduce the Emotional Processing Scale and the Short Form -36, V.2 Health Survey used within these questionnaires for the purpose of this thesis. **The scales must not be copied or reproduced for other purposes**.

3.1 Questionnaire 1.

A4 version

Participant No……...



Emotional **P**rocessing
In **C**hildbirth

Questionnaire 1

To be completed during your pregnancy
when you are approximately 13 weeks pregnant

Please place the completed questionnaire in the box provided in reception or alternatively take a pre-paid envelope and return by post as soon as possible.

SECTION 1: YOUR HEALTH AND WELLBEING[1]

The following questions ask for your views about your health.

How to complete this section:

Please read the following statements and questions and place a tick in the box that best fits how you feel.

For each question (or part of a question) please place a tick in the box which best fits your answer

1. In general would you say your health is: (please tick **one** box)

Excellent	Very good	Good	Fair	Poor
☐	☐	☐	☐	☐

2. Compared to <u>before you became pregnant</u> how would you rate your health in general now? (please tick **one** box)

Much better than before pregnancy	Somewhat better than before pregnancy	About the same	Somewhat worse than before pregnancy	Much worse than before pregnancy
☐	☐	☐	☐	☐

3. The following questions are about activities you might do during a typical day. Does you health now limit you in these activities? If so, by how much? (Please tick **one** box on each line)

	Yes, limited a lot	Yes, limited a little	No, not limited at all
a) **Vigorous activities** such as running, lifting heavy objects, participating in strenuous sports.	☐	☐	☐
b) **Moderate activities**, such as moving a table or pushing a vacuum.	☐	☐	☐
c) Lifting or carrying groceries	☐	☐	☐
d) Climbing **several flights** of stairs	☐	☐	☐
e) Climbing **one flight** of stairs	☐	☐	☐
f) Bending, kneeling or stooping	☐	☐	☐
g) Walking **more than a mile**	☐	☐	☐
	☐	☐	☐

[1] Ware, JE, Sherbourne, CD. 1992. The MOS 36-item Short-Form Health Survey (SF-36). *Medical Care*, 30, 6; 473-483

h) Walking **half a mile**

i) Walking **a 100 yards** ☐ ☐ ☐

j) Bathing and dressing yourself ☐ ☐ ☐

4. During the past 4 weeks how much of the time have you had any of the following problems with your work or other regular daily activities <u>as a result of your physical health</u>?
(Please tick **one** box on each line)

	All of the time	Most of the time	Some of the time	A little of the time	None of the time
a) Cut down on the **amount of time** you spent on work or other activities	☐	☐	☐	☐	☐
b) **Accomplished less** than you would like	☐	☐	☐	☐	☐
c) Were limited in the **kind** of work or other activities	☐	☐	☐	☐	☐
d) Had **difficulty** performing the work or other activities (took more effort)	☐	☐	☐	☐	☐

5. During the <u>past 4 weeks</u> how much of the time have you had any of the following problems with your work or other regular activities <u>as a result of any emotional problems</u> (such as feeling anxious or depressed)?
(Please tick **one** box on each line)

	All of the time	Most of the time	Some of the time	A little of the time	None of the time
a) Cut down on the **amount of time** you spent on work or other activities	☐	☐	☐	☐	☐
b) **Accomplished less** than you would like	☐	☐	☐	☐	☐
c) Did work or other activities **less carefully than usual**	☐	☐	☐	☐	☐

6. During the <u>past 4 weeks</u> to what extent have your physical health or emotional problems interfered with you normal social activities with family, neighbours or groups?
(Please tick **one** box)

Not at all	Slightly	Moderately	Quite a bit	Extremely
☐	☐	☐	☐	☐

7. How much <u>bodily</u> pain have you had during the <u>past 4 weeks</u>?
(Please tick **one** box)

None	Very mild	Mild	Moderate	Severe	Very severe
☐	☐	☐	☐	☐	☐

8. During the <u>past 4 weeks</u> how much did <u>pain</u> interfere with your normal work (including both outside the home and housework)?
(Please tick **one** box)

Not at all	Slightly	Moderately	Quite a bit	Extremely
☐	☐	☐	☐	☐

9. These questions are about how you feel and how things have been with you during the <u>past 4 weeks.</u> For each question please give one answer that comes closest to the way you have been feeling.
(Please tick **one** box on each line)

How much time <u>during the the last 4 weeks</u>:	All of the time	Most of he time	Some of the time	A little of the time	None of the time
a) Did you feel full of life?	☐	☐	☐	☐	☐
b) Have you been nervous?	☐	☐	☐	☐	☐
c) Have you felt so down in the dumps that nothing would cheer you up?	☐	☐	☐	☐	☐
d) Have you felt calm and peaceful?	☐	☐	☐	☐	☐
e) Did you have a lot of energy?	☐	☐	☐	☐	☐
f) Have you felt downhearted and low?	☐	☐	☐	☐	☐
g) Did you feel worn out?	☐	☐	☐	☐	☐
h) Have you been happy?	☐	☐	☐	☐	☐
i) Did you feel tired?	☐	☐	☐	☐	☐

10. During the <u>past 4 weeks</u> how much of the time has your <u>physical health or emotional problems</u> interfered with your social activities (like visiting friends, relatives etc.)?
(Please tick **one** box)

All of the time	Most of the time	Some of the time	A little of the time	None of the time
☐	☐	☐	☐	☐

11. How true or false is <u>each</u> of the following statements for you?
(Please tick **one** box on each line)

	Definitely true	Mostly true	Not sure	Mostly false	Definitely false
a) I seem to get ill more easily Than other people.	☐	☐	☐	☐	☐
b) I am as healthy as anybody I know	☐	☐	☐	☐	☐
c) I expect my health to get worse	☐	☐	☐	☐	☐
d) My health is excellent	☐	☐	☐	☐	☐

Now please go on to section 2

SECTION 2: YOUR EMOTIONS AND FEELINGS[2]

This part of the questionnaire tries to understand something about your emotions and feelings. In order to fill it in you will need to fix **the last week** firmly in your mind.

Could you first of all spend a few minutes thinking back over what you have been doing in the last week? Starting from one week ago today try to think about where you were, what you were doing, who you met or anything you may remember. If you have a diary or calendar check for any appointments or reminders of each day

LAST WEEK…..

With the last week in mind what would you say was the **strongest positive or pleasant** emotion that you felt?

With the last week in mind what would you say was the **strongest negative or unpleasant** emotion that you felt?

How to complete this section:

This questionnaire lists different descriptions of how you may have felt or acted last week, mostly related to negative emotional situations rather than positive. Each description has got a sliding scale under it. The scale moves from completely disagree (0) to completely agree (9). After reading each description show how much it applies to you last week by putting a circle around one of the numbers on the sliding scale. For example:

I kept my feelings to myself

0	1	2	3	4	5	6	7	8	9

Completely disagree……disagree……..in between ……agree……completely agree

If you circle number 6 this will mean that you mildly agree with the statement that you kept your feelings to yourself last week. If the statement "I kept my feelings to myself" fully describes the way you were last week then you would circle number 9.

0	1	2	3	4	5	6	7	8	9

Completely disagree……disagree……..in between ……agree……completely agree

f you circle number 0 then this would mean that you completely disagree with this description of your feelings last week.

[2] Baker, R. Thomas, S, Thomas PW, Owens, M. 2007. The development of an emotional processing scale. *Journal of Psychosomatic Research,* 62; 167-178.

Now please fill in your answers based on <u>last week.</u>

1. My emotions felt blunt/dull.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

2. I smothered my feelings.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

3. Unwanted feelings kept intruding.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

4. When upset or angry it was difficult to control what I said.

0	1	2	3	4	5	6	7	8	9

completely ……disagree …… in between ……..agree ……completely
disagree agree

5. I avoided looking at unpleasant things (e.g. on TV or in magazines).

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

6. I could not express my feelings.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

7. My emotional reactions lasted for more than a day.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

8. I reacted too much to what people said or did.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

9. Talking about negative feelings seemed to make them worse.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

10. My feelings did not seem to belong to me.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

11. I kept quiet about my feelings.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

12. I tended to repeatedly experience the same emotion.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

13. I wanted to get my own back on someone.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

14. I tried to talk only about pleasant things.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

15. It was hard to work out whether I felt ill or emotional.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

16. I bottled up my emotions.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

17. I felt overwhelmed by my emotions.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

18. I felt the urge to smash something.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

19. I could not tolerate unpleasant feelings.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

20. There seemed to be a big blank in my feelings.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

21. I tried not to show my feelings to others.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

22. I kept thinking about the same emotional situation again and again.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

23. It was hard for me to wind down.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

24. I tried very hard to avoid things that might make me upset.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

25. Sometimes I got strong feelings but I'm not sure if they were emotions.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

Are there any other important things that you would like to add?

Now please go on to section 3

SECTION 3: YOUR PSYCHOLOGICAL HEALTH [3]

In this section you are again asked to think again about how you have felt **in the past week** (not just your feelings today)**.**

How to complete this section

Please read the following statements and put a tick in the box which comes closest to describing how you have been feeling in the last 7 days.

For example:

I have felt happy:

[ ] Yes, all of the time

[ ] Yes, most of the time

[ ] No, not very often

[ ] No, not at all

If you put a tick in the second box this would mean that you felt happy for most of the time during the past week. Now please complete the following questions.

IN THE PAST 7 DAYS….

1. I have been able to laugh and see the funny side of things:
□ As much as I always could
□ Not quite so much now
□ Definitely not so much now
□ Not at all

2. I have looked forward with enjoyment to things:
□ As much as I ever did
□ Rather less than I used to
□ Definitely less than I used to
□ Hardly at all

3. I have blamed myself unnecessarily when things went wrong
□ Yes, most of the time
□ Yes, some of the time
□ Not very often
□ No, never

[3] Cox, JL, Holden, JM, Sagovsky, R. 1987. Detection of postnatal depression: development of the 10-item Edinburgh Postnatal Depression Scale. *British Journal of Psychiatry*, 150; 782-786.

4. I have been anxious or worried for no good reason

□ No, not at all
□ Hardly ever
□ Yes, sometimes
□ Yes, very often

5. I have felt scared or panicky for no very good reason

□ Yes, quite a lot
□ Yes, sometimes
□ No, not much
□ No, not at all

6. Things have been getting on top of me

□ Yes, most of the time I haven't been able to cope at all
□ Yes, sometimes I haven't been coping as well as usual
□ No, most of the time I have coped quite well
□ No. I have been coping as well as ever

7. I have been so unhappy that I have had difficulty sleeping

□ Yes, most of the time
□ Yes, sometimes
□ Not very often
□ No, not at all

8. I have felt sad or miserable

□ Yes, most of the time
□ Yes, quite often
□ Not very often
□ No, not at all

9. I have been so unhappy that I have been crying

□ Yes, most of the time
□ Yes, quite often
□ Only occasionally
□ No, never

10. The thought of harming myself has occurred to me

□ Yes, quite often
□ Sometimes
□ Hardly ever
□ Never

Now please go on to section 4

SECTION 4: YOUR FEELINGS ABOUT YOURSELF[4]

The following section asks you questions about your general feelings about yourself.

How to complete this section:

You are asked whether you strongly agree, agree, disagree or strongly disagree with the following statements. Please put a tick in the box which best describes your feelings.

For example if you strongly agree that you are satisfied with yourself on the whole then place a tick in the first box

(Please tick **one** box on each line)

	Strongly agree	Agree	Disagree	Strongly disagree
1. On the whole I am satisfied with myself	☐	☐	☐	☐
2. At times I think I am no good at all	☐	☐	☐	☐
3. I feel that I have a number of good qualities	☐	☐	☐	☐
4. I am able to do things as well as most other people	☐	☐	☐	☐
5. I feel I do not have much to be proud of	☐	☐	☐	☐
6. I certainly feel useless at times	☐	☐	☐	☐
7. I feel that I am a person of worth, Or at least on an equal plane with others	☐	☐	☐	☐
8. I wish I could have more respect for myself	☐	☐	☐	☐
9. All in all I am inclined to feel I am a failure	☐	☐	☐	☐
10. I take a positive attitude towards myself	☐	☐	☐	☐

Now please go on to section 5

[4] Rosenberg, M. 1989. *Society and the Adolescent Self-Image.* Revised Edition. Middeltown, CT. Wesleyan University Press

SECTION 5: ABOUT YOU

The following section asks for answers to questions about your general health and lifestyle

1. Occupation ……..

2. Age (in years)……

3. How many children have you given birth to? ……

4. How many children do you have living with you? ……

5. Have you received any fertility treatment in order to become pregnant? ……..... Yes No

6. Do you have a partner? …… Yes No

7. Please tick the box that best describes you:

Living with partner	Living alone (with or without children)	Living with parents	Other (please explain)

8. How would you describe your relationship with your partner? Please tick the box that applies most:

Very good	Good	At times good / at times not so good	Poor	Very poor

9. Are you currently suffering from any medical condition for which you are receiving treatment?

Yes No

Please indicate what condition this is

What treatment or medication are you receiving?

10. Are you currently suffering from any psychological condition for which you are receiving treatment either from your GP or a psychiatrist?

Yes No

Please indicate what condition this is

What treatment or medication are you receiving?

11. Have you suffered from any problems in the past that required referral to a psychiatrist?

☐ Yes ☐ No

Please indicate what condition this was

What treatment or medication did you receive?

12. Have you received any medication for the treatment of anxiety from your GP in the past?

☐ Yes ☐ No

13. Have you received any medication for the treatment of depression from your GP in the past?

☐ Yes ☐ No

14. Has any member of your immediate family suffered from depression or any other psychiatric condition?

☐ Yes ☐ No

15. Have you suffered from serious depression following the birth of a child?

☐ Yes ☐ No

16. Have you experienced any of the following 'life events' in the past twelve months? Please place a tick in one box on each line:

Divorce …… ☐ Yes ☐ No

Death of a loved one …… ☐ Yes ☐ No

Moving house …… ☐ Yes ☐ No

New job …… ☐ Yes ☐ No

Chronic illness (self or family) …… ☐ Yes ☐ No

The following statements relate to the support you have in your life. Please place a tick in the box which is closest to how you feel.

17. I feel supported practically by my partner

1	2	3	4	5
As much as I would like		in between		Much less than I would like

18. I feel supported emotionally by my partner

1	2	3	4	5
As much as I would like		in between		Much less than I would like

19. I feel supported practically by my family

1	2	3	4	5
As much as I would like		in between		Much less than I would like

20. I feel supported emotionally by my family

1	2	3	4	5
As much as I would like		in between		Much less than I would like

21. I feel supported practically by my friends

1	2	3	4	5
As much as I would like		in between		Much less than I would like

22. I feel supported emotionally by my friends

1	2	3	4	5
As much as I would like		in between		Much less than I would like

23. To be certain that we meet the emotional needs of women in all ethnic groups could you please tell us which of the following groups best describes you:

- ☐ White
- ☐ African/Caribbean
- ☐ Indian
- ☐ Pakistani
- ☐ Bangladeshi
- ☐ Chinese
- ☐ Mixed race
- ☐ Other (please specify)

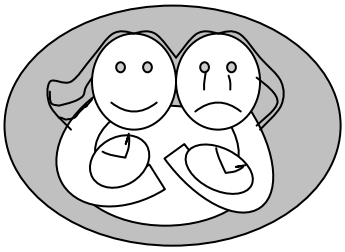
Please use this box to add any further comments you would like to make.

Thank you for your help and time in completing this questionnaire.

If you have any concerns about your physical or emotional health please contact your midwife, GP or other relevant health professional

3.2 Questionnaire 2.

Participant No……...



Emotional **P**rocessing
In **C**hildbirth

Questionnaire 2

To be completed when you are approximately
34 weeks pregnant

Please return the questionnaire by post as soon as possible
in the pre-paid envelope provided
. Many thanks for your help.

SECTION 1: YOUR HEALTH AND WELLBEING[5]

The following questions ask for your views about your health.

How to complete this section:

Please read the following statements and questions and place a tick in the box that best fits how you feel.

For each question (or part of a question) please place a tick in the box which best fits your answer

1. In general would you say your health is: (please tick **one** box)

Excellent	Very good	Good	Fair	Poor
☐	☐	☐	☐	☐

2. Compared to <u>before you became pregnant</u> how would you rate your health in general now? (please tick **one** box)

Much better than before pregnancy	Somewhat better than before pregnancy	About the same	Somewhat worse than before pregnancy	Much worse than before pregnancy
☐	☐	☐	☐	☐

3. The following questions are about activities you might do during a typical day. Does you health now limit you in these activities? If so, by how much? (Please tick **one** box on each line)

	Yes, limited a lot	Yes, limited a little	No, not limited at all
a) **Vigorous activities** such as running, lifting heavy objects, participating in strenuous sports.	☐	☐	☐
b) **Moderate activities**, such as moving a table or pushing a vacuum.	☐	☐	☐
c) Lifting or carrying groceries	☐	☐	☐
d) Climbing **several flights** of stairs	☐	☐	☐
e) Climbing **one flight** of stairs	☐	☐	☐
f) Bending, kneeling or stooping	☐	☐	☐
g) Walking **more than a mile**	☐	☐	☐
	☐	☐	☐

[5] Ware, JE, Sherbourne, CD. 1992. The MOS 36-item Short-Form health Survey (SF-36). *Medical Care*, 30, 6; 473-483

h) Walking **half a mile**

i) Walking **a 100 yards** ☐ ☐ ☐

j) Bathing and dressing yourself ☐ ☐ ☐

4. During the past 4 weeks how much of the time have you had any of the following problems with your work or other regular daily activities <u>as a result of your physical health</u>?
(Please tick **one** box on each line)

	All of the time	Most of the time	Some of the time	A little of the time	None of the time
a) Cut down on the **amount of time** you spent on work or other activities	☐	☐	☐	☐	☐
b) **Accomplished less** than you would like	☐	☐	☐	☐	☐
c) Were limited in the **kind** of work or other activities	☐	☐	☐	☐	☐
d) Had **difficulty** performing the work or other activities (took more effort)	☐	☐	☐	☐	☐

5. During the <u>past 4 weeks</u> how much of the time have you had any of the following problems with your work or other regular activities <u>as a result of any emotional problems</u> (such as feeling anxious or depressed)?
(Please tick **one** box on each line)

	All of the time	Most of the time	Some of the time	A little of the time	None of the time
a) Cut down on the **amount of time** you spent on work or other activities	☐	☐	☐	☐	☐
b) **Accomplished less** than you would like	☐	☐	☐	☐	☐
c) Did work or other activities **less carefully than usual**	☐	☐	☐	☐	☐

6. During the <u>past 4 weeks</u> to what extent have your physical health or emotional problems interfered with you normal social activities with family, neighbours or groups?
(Please tick **one** box)

Not at all	Slightly	Moderately	Quite a bit	Extremely
☐	☐	☐	☐	☐

7. How much <u>bodily</u> pain have you had during the <u>past 4 weeks</u>?
(Please tick **one** box)

None	Very mild	Mild	Moderate	Severe	Very severe
☐	☐	☐	☐	☐	☐

8. During the <u>past 4 weeks</u> how much did <u>pain</u> interfere with your normal work (including both outside the home and housework)?
(Please tick **one** box)

Not at all	Slightly	Moderately	Quite a bit	Extremely
☐	☐	☐	☐	☐

9. These questions are about how you feel and how things have been with you during the <u>past 4 weeks.</u> For each question please give one answer that comes closest to the way you have been feeling.
(Please tick **one** box on each line)

How much time <u>during the the last 4 weeks</u>:	All of the time	Most of he time	Some of the time	A little of the time	None of the time
a) Did you feel full of life?	☐	☐	☐	☐	☐
b) Have you been nervous?	☐	☐	☐	☐	☐
c) Have you felt so down in the dumps that nothing would cheer you up?	☐	☐	☐	☐	☐
d) Have you felt calm and peaceful?	☐	☐	☐	☐	☐
e) Did you have a lot of energy?	☐	☐	☐	☐	☐
f) Have you felt downhearted and low?	☐	☐	☐	☐	☐
g) Did you feel worn out?	☐	☐	☐	☐	☐
h) Have you been happy?	☐	☐	☐	☐	☐
i) Did you feel tired?	☐	☐	☐	☐	☐

10. During the <u>past 4 weeks</u> how much of the time has your <u>physical health or emotional problems</u> interfered with your social activities (like visiting friends, relatives etc.)?
(Please tick **one** box)

All of the time	Most of the time	Some of the time	A little of the time	None of the time
☐	☐	☐	☐	☐

11. How true or false is <u>each</u> of the following statements for you?
(Please tick **one** box on each line)

	Definitely true	Mostly true	Not sure	Mostly false	Definitely false
a) I seem to get ill more easily than other people.	☐	☐	☐	☐	☐
b) I am as healthy as anybody I know	☐	☐	☐	☐	☐
c) I expect my health to get worse	☐	☐	☐	☐	☐
d) My health is excellent	☐	☐	☐	☐	☐

Now please go on to section 2

SECTION 2: YOUR EMOTIONS AND FEELINGS[6]

This part of the questionnaire tries to understand something about your emotions and feelings. In order to fill it in you will need to fix **the last week** firmly in your mind.

Could you first of all spend a few minutes thinking back over what you have been doing in the last week? Starting from one week ago today try to think about where you were, what you were doing, who you met or anything you may remember. If you have a diary or calendar check for any appointments or reminders of each day

LAST WEEK…..

With the last week in mind what would you say was the **strongest positive or pleasant** emotion that you felt?

With the last week in mind what would you say was the **strongest negative or unpleasant** emotion that you felt?

How to complete this section:

This questionnaire lists different descriptions of how you may have felt or acted last week, mostly related to negative emotional situations rather than positive. Each description has got a sliding scale under it. The scale moves from completely disagree (0) to completely agree (9). After reading each description show how much it applies to you last week by putting a circle around one of the numbers on the sliding scale. For example:

I kept my feelings to myself

0	1	2	3	4	5	6	7	8	9

Completely disagree……disagree……..in between ……agree…….completely agree

If you circle number 6 this will mean that you mildly agree with the statement that you kept your feelings to yourself last week. If the statement "I kept my feelings to myself" fully describes the way you were last week then you would circle number 9.

0	1	2	3	4	5	6	7	8	9

Completely disagree……disagree……..in between ……agree…….completely agree

If you circle number 0 then this would mean that you completely disagree with this description of your feelings last week.

[6] Baker, R. Thomas, S, Thomas PW, Owens, M. 2007. The development of an emotional processing scale. *Journal of Psychosomatic Research,* 62; 167-178.

Now please fill in your answers based on <u>last week.</u>

1. My emotions felt blunt/dull.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

2. I smothered my feelings.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

3. Unwanted feelings kept intruding.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

4. When upset or angry it was difficult to control what I said.

0	1	2	3	4	5	6	7	8	9

completely ……disagree …… in between ……..agree ……completely
disagree agree

5. I avoided looking at unpleasant things (e.g. on TV or in magazines).

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

6. I could not express my feelings.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

7. My emotional reactions lasted for more than a day.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

8. I reacted too much to what people said or did.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

9. Talking about negative feelings seemed to make them worse.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

10. My feelings did not seem to belong to me.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

11. I kept quiet about my feelings.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

12. I tended to repeatedly experience the same emotion.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

13. I wanted to get my own back on someone.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

14. I tried to talk only about pleasant things.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

15. It was hard to work out whether I felt ill or emotional.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

16. I bottled up my emotions.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

17. I felt overwhelmed by my emotions.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

18. I felt the urge to smash something.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

19. I could not tolerate unpleasant feelings.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

20. There seemed to be a big blank in my feelings.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

21. I tried not to show my feelings to others.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

22. I kept thinking about the same emotional situation again and again.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

23. It was hard for me to wind down.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

24. I tried very hard to avoid things that might make me upset.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

25.Sometimes I got strong feelings but I'm not sure if they were emotions.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

Are there any other important things that you would like to add?

Now please go on to section 3

SECTION 3: YOUR PSYCHOLOGICAL HEALTH [7]

In this section you are again asked to think again about how you have felt **in the past week** (not just your feelings today)**.**

How to complete this section

Please read the following statements and put a tick in the box which comes closest to describing how you have been feeling in the last 7 days.

For example:

I have felt happy:

[ ] Yes, all of the time

[ ] Yes, most of the time

[ ] No, not very often

[ ] No, not at all

If you put a tick in the second box this would mean that you felt happy for most of the time during the past week. Now please complete the following questions.

IN THE PAST 7 DAYS….

1. I have been able to laugh and see the funny side of things:
□ As much as I always could
□ Not quite so much now
□ Definitely not so much now
□ Not at all

2. I have looked forward with enjoyment to things:
□ As much as I ever did
□ Rather less than I used to
□ Definitely less than I used to
□ Hardly at all

3. I have blamed myself unnecessarily when things went wrong
□ Yes, most of the time
□ Yes, some of the time
□ Not very often
□ No, never

[7] Cox, JL, Holden, JM, Sagovsky, R. 1987. Detection of postnatal depression: development of the 10-item Edinburgh Postnatal Depression Scale. *British Journal of Psychiatry*, 150; 782-786.

4. I have been anxious or worried for no good reason

□ No, not at all
□ Hardly ever
□ Yes, sometimes
□ Yes, very often

5. I have felt scared or panicky for no very good reason

□ Yes, quite a lot
□ Yes, sometimes
□ No, not much
□ No, not at all

6. Things have been getting on top of me

□ Yes, most of the time I haven't been able to cope at all
□ Yes, sometimes I haven't been coping as well as usual
□ No, most of the time I have coped quite well
□ No. I have been coping as well as ever

7. I have been so unhappy that I have had difficulty sleeping

□ Yes, most of the time
□ Yes, sometimes
□ Not very often
□ No, not at all

8. I have felt sad or miserable

□ Yes, most of the time
□ Yes, quite often
□ Not very often
□ No, not at all

9. I have been so unhappy that I have been crying

□ Yes, most of the time
□ Yes, quite often
□ Only occasionally
□ No, never

10. The thought of harming myself has occurred to me

□ Yes, quite often
□ Sometimes
□ Hardly ever
□ Never

Now please go on to section 4

SECTION 4: YOUR FEELINGS ABOUT YOURSELF[8]

The following section asks you questions about your general feelings about yourself.

How to complete this section:

You are asked whether you strongly agree, agree, disagree or strongly disagree with the following statements. Please put a tick in the box which best describes your feelings.

For example if you strongly agree that you are satisfied with yourself on the whole then place a tick in the first box

(Please tick **one** box on each line)

	Strongly agree	Agree	Disagree	Strongly disagree
1. On the whole I am satisfied with myself	☐	☐	☐	☐
2. At times I think I am no good at all	☐	☐	☐	☐
3. I feel that I have a number of good qualities	☐	☐	☐	☐
4. I am able to do things as well as most other people	☐	☐	☐	☐
5. I feel I do not have much to be proud of	☐	☐	☐	☐
6. I certainly feel useless at times	☐	☐	☐	☐
7. I feel that I am a person of worth, or at least on an equal plane with others	☐	☐	☐	☐
8. I wish I could have more respect for myself	☐	☐	☐	☐
9. All in all I am inclined to feel I am a failure	☐	☐	☐	☐
10. I take a positive attitude towards myself	☐	☐	☐	☐

Now please go on to section 5

[8] Rosenberg, M. 1989. *Society and the Adolescent Self-Image.* Revised Edition. Middeltown, CT. Wesleyan University Press

SECTION 5: ABOUT YOUR PREGNANCY

The following section asks for answers to questions about your general health and lifestyle during pregnancy.

1. How many babies are you expecting? ☐

2. **Since becoming pregnant have you suffered from any condition for which you have needed treatment from your GP?** ☐ Yes ☐ No

Please indicate what condition this is …… ☐

What treatment or medication are you receiving for it?..... ☐

3. During your pregnancy have you been admitted to hospital for any reason? ☐ Yes ☐ No

If yes, please specify …… ☐

4.Have you experienced any of the following 'life events' in the past twelve months? Please place a tick in one box on <u>each line</u>:

Divorce …… ☐ Yes ☐ No

Death of a loved one …… ☐ Yes ☐ No

Moving house …… ☐ Yes ☐ No

New job …… ☐ Yes ☐ No

Chronic illness (self or family) …… ☐ Yes ☐ No

The following statements relate to the support you have in your life. Please place a tick in the box which is closest to how you feel.

5. I feel supported practically by my partner

1	2	3	4	5

As much as I would like ……in between……Much less than I would like

6. I feel supported emotionally by my partner

1	2	3	4	5

As much as I would like ……in between……Much less than I would like

7. I feel supported practically by my family

1	2	3	4	5

As much as I would like ……in between……Much less than I would like

8. I feel supported emotionally by my family

1	2	3	4	5

As much as I would like ……in between……Much less than I would like

9. I feel supported practically by my friends

1	2	3	4	5

As much as I would like ……in between……Much less than I would like

10. I feel supported emotionally by my friends

1	2	3	4	5

As much as I would like ……in between……Much less than I would like

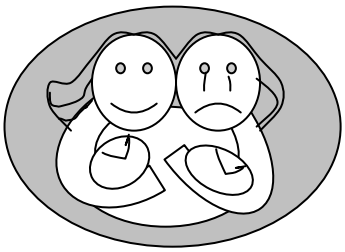
Please use this box to add any further comments you would like to make.

Thank you for your help and time in completing this questionnaire.

If you have any concerns about your physical or emotional health please contact your midwife, GP or other relevant health professional

3.3 Questionnaire 3.

Participant No……...



Emotional **P**rocessing
In **C**hildbirth

Questionnaire 3

To be completed approximately 6 weeks
after the birth of your baby

Please return the questionnaire by post in the pre-paid envelope provided as soon as possible. Many thanks for your help.

SECTION 1: YOUR HEALTH AND WELLBEING[9]

The following questions ask for your views about your health.

How to complete this section:

Please read the following statements and questions and place a tick in the box that best fits how you feel.

For each question (or part of a question) please place a tick in the box which best fits your answer

1. In general would you say your health is: (please tick **one** box)

Excellent	Very good	Good	Fair	Poor
☐	☐	☐	☐	☐

2. Compared to <u>before you became pregnant</u> how would you rate your health in general now? (please tick **one** box)

Much better than before pregnancy	Somewhat better than before pregnancy	About the same	Somewhat worse than before pregnancy	Much worse than before pregnancy
☐	☐	☐	☐	☐

3. The following questions are about activities you might do during a typical day. Does you health now limit you in these activities? If so, by how much? (Please tick **one** box on each line)

	Yes, limited a lot	Yes, limited a little	No, not limited at all
a) **Vigorous** activities such as running, lifting heavy objects, participating in strenuous sports.	☐	☐	☐
b) **Moderate** activities, such as moving a table or pushing a vacuum.	☐	☐	☐
c) Lifting or carrying groceries	☐	☐	☐
d) Climbing **several flights** of stairs	☐	☐	☐
e) Climbing **one flight** of stairs	☐	☐	☐
f) Bending, kneeling or stooping	☐	☐	☐
g) Walking **more than a mile**	☐	☐	☐

[9] Ware, JE, Sherbourne, CD. 1992. The MOS 36-item Short-Form health Survey (SF-36). *Medical Care*, 30, 6; 473-483

h) Walking **half a mile**	☐	☐	☐
i) Walking **a 100 yards**	☐	☐	☐
j) Bathing and dressing yourself	☐	☐	☐

4. During the past 4 weeks how much of the time have you had any of the following problems with your work or other regular daily activities <u>as a result of your physical health</u>?
(Please tick **one** box on each line)

	All of the time	Most of the time	Some of the time	A little of the time	None of the time
a) Cut down on the **amount of time** you spent on work or other activities	☐	☐	☐	☐	☐
b) **Accomplished less** than you would like	☐	☐	☐	☐	☐
c) Were limited in the **kind** of work or other activities	☐	☐	☐	☐	☐
d) Had **difficulty** performing the work or other activities (took more effort)	☐	☐	☐	☐	☐

5. During the <u>past 4 weeks</u> how much of the time have you had any of the following problems with your work or other regular activities <u>as a result of any emotional problems</u> (such as feeling anxious or depressed)?
(Please tick **one** box on each line)

	All of the time	Most of the time	Some of the time	A little of the time	None of the time
a) Cut down on the **amount of time** you spent on work or other activities	☐	☐	☐	☐	☐
b) **Accomplished less** than you would like	☐	☐	☐	☐	☐
c) Did work or other activities **less carefully than usual**	☐	☐	☐	☐	☐

6. During the <u>past 4 weeks</u> to what extent have your physical health or emotional problems interfered with you normal social activities with family, neighbours or groups?
(Please tick **one** box)

Not at all	Slightly	Moderately	Quite a bit	Extremely
☐	☐	☐	☐	☐

7. How much <u>bodily</u> pain have you had during the <u>past 4 weeks</u>?
(Please tick **one** box)

None	Very mild	Mild	Moderate	Severe	Very severe
☐	☐	☐	☐	☐	☐

8. During the <u>past 4 weeks</u> how much did <u>pain</u> interfere with your normal work (including both outside the home and housework)?
(Please tick **one** box)

Not at all	Slightly	Moderately	Quite a bit	Extremely
☐	☐	☐	☐	☐

9. These questions are about how you feel and how things have been with you during the <u>past 4 weeks.</u> For each question please give one answer that comes closest to the way you have been feeling.
(Please tick **one** box on each line)

How much time <u>during the the last 4 weeks</u>:	All of the time	Most of he time	Some of the time	A little of the time	None of the time
a) Did you feel full of life?	☐	☐	☐	☐	☐
b) Have you been nervous?	☐	☐	☐	☐	☐
c) Have you felt so down in the dumps that nothing would cheer you up?	☐	☐	☐	☐	☐
d) Have you felt calm and peaceful?	☐	☐	☐	☐	☐
e) Did you have a lot of energy?	☐	☐	☐	☐	☐
f) Have you felt downhearted and low?	☐	☐	☐	☐	☐
g) Did you feel worn out?	☐	☐	☐	☐	☐
h) Have you been happy?	☐	☐	☐	☐	☐
i) Did you feel tired?	☐	☐	☐	☐	☐

10. During the <u>past 4 weeks</u> how much of the time has your <u>physical health or emotional problems</u> interfered with your social activities (like visiting friends, relatives etc.)?
(Please tick **one** box)

All of the time	Most of the time	Some of the time	A little of the time	None of the time
☐	☐	☐	☐	☐

11. How true or false is <u>each</u> of the following statements for you?
(Please tick **one** box on each line)

	Definitely true	Mostly true	Not sure	Mostly false	Definitely false
a) I seem to get ill more easily than other people.	☐	☐	☐	☐	☐
b) I am as healthy as anybody I know	☐	☐	☐	☐	☐
c) I expect my health to get worse	☐	☐	☐	☐	☐
d) My health is excellent	☐	☐	☐	☐	☐

Now please go on to section 2

SECTION 2: YOUR EMOTIONS AND FEELINGS[10]

This part of the questionnaire tries to understand something about your emotions and feelings. In order to fill it in you will need to fix **the last week** firmly in your mind.

Could you first of all spend a few minutes thinking back over what you have been doing in the last week? Starting from one week ago today try to think about where you were, what you were doing, who you met or anything you may remember. If you have a diary or calendar check for any appointments or reminders of each day

LAST WEEK…..

With the last week in mind what would you say was the **strongest positive or pleasant** emotion that you felt?

With the last week in mind what would you say was the **strongest negative or unpleasant** emotion that you felt?

How to complete this section:

This questionnaire lists different descriptions of how you may have felt or acted last week, mostly related to negative emotional situations rather than positive. Each description has got a sliding scale under it. The scale moves from completely disagree (0) to completely agree (9). After reading each description show how much it applies to you last week by putting a circle around one of the numbers on the sliding scale. For example:

I kept my feelings to myself

0	1	2	3	4	5	6	7	8	9

Completely disagree……disagree……..in between ……agree…….completely agree

If you circle number 6 this will mean that you mildly agree with the statement that you kept your feelings to yourself last week. If the statement "I kept my feelings to myself" fully describes the way you were last week then you would circle number 9.

0	1	2	3	4	5	6	7	8	9

Completely disagree……disagree……..in between ……agree…….completely agree

If you circle number 0 then this would mean that you completely disagree with this description of your feelings last week.

[10] Baker, R. Thomas, S, Thomas PW, Owens, M. 2007. The development of an emotional processing scale. *Journal of Psychosomatic Research,* 62; 167-178.

Now please fill in your answers based on <u>last week.</u>

1. My emotions felt blunt/dull.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

2. I smothered my feelings.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

3. Unwanted feelings kept intruding.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

4. When upset or angry it was difficult to control what I said.

0	1	2	3	4	5	6	7	8	9

completely ……disagree …… in between ……..agree ……completely
disagree agree

5. I avoided looking at unpleasant things (e.g. on TV or in magazines).

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

6. I could not express my feelings.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

7. My emotional reactions lasted for more than a day.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

8. I reacted too much to what people said or did.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

9. Talking about negative feelings seemed to make them worse.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

10. My feelings did not seem to belong to me.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

11. I kept quiet about my feelings.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

12. I tended to repeatedly experience the same emotion.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

13. I wanted to get my own back on someone.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

14. **I tried to talk only about pleasant things.**

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

15. It was hard to work out whether I felt ill or emotional.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

16. I bottled up my emotions.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

17. I felt overwhelmed by my emotions.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

18. I felt the urge to smash something.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

19. I could not tolerate unpleasant feelings.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

20. There seemed to be a big blank in my feelings.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

21. I tried not to show my feelings to others.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

22. I kept thinking about the same emotional situation again and again.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

23. It was hard for me to wind down.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

24. I tried very hard to avoid things that might make me upset.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

25. Sometimes I got strong feelings but I'm not sure if they were emotions.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

Are there any other important things that you would like to add?

Now please go on to section 3

SECTION 3: YOUR PSYCHOLOGICAL HEALTH [11]

In this section you are again asked to think again about how you have felt **in the past week** (not just your feelings today)**.**

How to complete this section

Please read the following statements and put a tick in the box which comes closest to describing how you have been feeling in the last 7 days.

For example:

I have felt happy:

[ ] Yes, all of the time

[ ] Yes, most of the time

[ ] No, not very often

[ ] No, not at all

If you put a tick in the second box this would mean that you felt happy for most of the time during the past week. Now please complete the following questions.

IN THE PAST 7 DAYS….

1.I have been able to laugh and see the funny side of things:
□ As much as I always could
□ Not quite so much now
□ Definitely not so much now
□ Not at all

2.I have looked forward with enjoyment to things:
□ As much as I ever did
□ Rather less than I used to
□ Definitely less than I used to
□ Hardly at all

3.I have blamed myself unnecessarily when things went wrong
□ Yes, most of the time
□ Yes, some of the time
□ Not very often
□ No, never

[11] Cox, JL, Holden, JM, Sagovsky, R. 1987. Detection of postnatal depression: development of the 10-item Edinburgh Postnatal Depression Scale. *British Journal of Psychiatry*, 150; 782-786.

4.I have been anxious or worried for no good reason
□ No, not at all
□ Hardly ever
□ Yes, sometimes
□ Yes, very often

5.I have felt scared or panicky for no very good reason
□ Yes, quite a lot
□ Yes, sometimes
□ No, not much
□ No, not at all

6.Things have been getting on top of me
□ Yes, most of the time I haven't been able to cope at all
□ Yes, sometimes I haven't been coping as well as usual
□ No, most of the time I have coped quite well
□ No. I have been coping as well as ever

7.I have been so unhappy that I have had difficulty sleeping
□ Yes, most of the time
□ Yes, sometimes
□ Not very often
□ No, not at all

8.I have felt sad or miserable
□ Yes, most of the time
□ Yes, quite often
□ Not very often
□ No, not at all

9.I have been so unhappy that I have been crying
□ Yes, most of the time
□ Yes, quite often
□ Only occasionally
□ No, never

10. The thought of harming myself has occurred to me
□ Yes, quite often
□ Sometimes
□ Hardly ever
□ Never

Now please go on to section 4

SECTION 4: YOUR FEELINGS ABOUT YOURSELF[12]

The following section asks you questions about your general feelings about yourself.

How to complete this section:

You are asked whether you strongly agree, agree, disagree or strongly disagree with the following statements. Please put a tick in the box which best describes your feelings.

For example if you strongly agree that you are satisfied with yourself on the whole then place a tick in the first box

(Please tick **one** box on each line)

	Strongly agree	Agree	Disagree	Strongly disagree
1. On the whole I am satisfied with myself	☐	☐	☐	☐
2. At times I think I am no good at all	☐	☐	☐	☐
3. I feel that I have a number of good qualities	☐	☐	☐	☐
4. I am able to do things as well as most other people	☐	☐	☐	☐
5. I feel I do not have much to be proud of	☐	☐	☐	☐
6. I certainly feel useless at times	☐	☐	☐	☐
7. I feel that I am a person of worth, or at least on an equal plane with others	☐	☐	☐	☐
8. I wish I could have more respect for myself	☐	☐	☐	☐
9. All in all I am inclined to feel I am a failure	☐	☐	☐	☐
10. I take a positive attitude towards myself	☐	☐	☐	☐

Now please go on to section 5

[12] Rosenberg, M. 1989. *Society and the Adolescent Self-Image.* Revised Edition. Middeltown, CT. Wesleyan University Press

PART 5: ABOUT YOUR BIRTH AND EARLY PARENTHOOD

The following section asks for answers to questions about your birth experience and general health and lifestyle after childbirth.

1. What type of birth did you experience? (Please place a tick in the appropriate box)

Normal vaginal birth …… ☐

Vaginal birth with the aid of ventouse (suction cup) …… ☐

Vaginal birth with the aid of forceps …… ☐

Caesarean section (planned) …… ☐

Caesarean section (emergency) …… ☐

2. Did you have the type of labour and birth that you planned? ☐ Yes ☐ No

3. Do you feel happy about your birth experience? ☐ Yes ☐ No

If you have answered no please explain why you do not feel happy.

4. How did you feed your baby when was he/she was first born? (Please tick the appropriate box)

Breast …… ☐

Bottle …… ☐

5. How are you feeding your baby now? (please tick the appropriate box)

Breast …… ☐

Bottle …… ☐

6. Have you experienced any problems feeding your baby? ☐ Yes ☐ No

If you have answered yes, please explain

7. Have any of the following conditions caused you problems since the birth of your baby? (Please place a tick in the box next to all that apply)

Painful stitches, infection, bruising or pain in your perineum …… ☐

Infection or pain in a caesarean section wound …… ☐

Difficulty passing urine or holding on to urine …… ☐

Painful haemorrhoids …… ☐

Backache …… ☐

Fatigue …… ☐

8. Since having your baby have you been admitted into hospital again for any reason?

☐ Yes ☐ No

If yes, please explain the reason below.

The following statements relate to the support you have in your life. (Please place a tick in the box which is closest to how you have felt since the birth of your baby.)

9. I felt supported practically by my midwife following the birth of my baby

As much as I would like …… in between …… Much less than I would like

10. I felt emotionally supported by my midwife following the birth of my baby

As much as I would like …… in between …… Much less than I would like

11. I feel supported practically by my partner

As much as I would like …… in between …… Much less than I would like

Currently I do not have a partner …… ☐

12. I feel supported emotionally by my partner

As much as I would like …… in between …… Much less than I would like

Currently I do not have a partner …… ☐

13. I feel supported practically by my family

As much as I would like …… in between …… Much less than I would like

14. I feel supported emotionally by my family

As much as I would like ……in between…… Much less than I would like

15. I feel supported practically by my friends

As much as I would like ……in between…… Much less than I would like

16. I feel supported emotionally by my friends

As much as I would like ……in between…… Much less than I would like

Please use the box below to make any further comments you wish about your birth experience or your health and wellbeing since you had your baby?

Thank you for your help and time in completing this questionnaire. Please return it in the pre-paid envelope provided.

If you have any concerns about your physical or emotional health please contact your midwife, GP or other relevant health professional

3.4 Reminder letter for Questionnaire 1

Trust headed paper

Name
Address

Date

Emotional Processing In Childbirth (EPIC) Study.

A study of women's emotional wellbeing during pregnancy and the early weeks after birth and their risks of developing postnatal depression

Dear …,

It is now some time since you agreed to participate in the above study and you received, or were sent, the first questionnaire to complete. Unfortunately I have not received the completed questionnaire.

It may be that it is in the post, in which case I would like to thank you very much for taking the time to complete it. Your contribution is valuable to the findings of the study.

If you have decided that you no longer wish to take part then I respect your wish, but would ask that if possible you return the blank questionnaire in the stamped addressed envelope provided so that I can remove your name from our records and do not contact you further.

I would like to take this opportunity to wish you well with your pregnancy and birth.

Yours sincerely,

Carol Wilkins
Registered Midwife and Midwifery Lecturer

Tel: 023 9228 6000 Ext 4630
E-mail: cwilkins@bournemouth.ac.uk

3.5 Reminder letter for Questionnaire 2

Trust headed paper

Name
Address

Date

Emotional Processing In Childbirth (EPIC) Study.

A study of women's emotional wellbeing during pregnancy and the early weeks after birth and their risks of developing postnatal depression

Dear ….,

Recently I sent you the second questionnaire in the above study for completion. According to our records we have not yet received your completed copy.

It may be that it is in the post, in which case I would like to thank you very much for taking the time to complete it. If you have not yet completed it I would urge you to do so. We value your contribution highly and the ultimate success and outcome of the study which will impact on the future care of pregnant women depends on the goodwill of women like you who agreed to participate.

If you have decided that you no longer want to take part then I respect your wish, but would ask that if possible you return the blank questionnaire in the stamped addressed envelope provided in order that I can remove your name from our records

I would like to take this opportunity to wish you well with your pregnancy and birth.

Yours sincerely,

Carol Wilkins
Registered Midwife and Senior Lecturer in Midwifery

Tel: 023 9228 6000 Ext 4630
E-mail: cwilkins@bournemouth.ac.uk

3.6 Reminder letter for Questionnaire 3

Trust headed paper

Name
Address

Date

Emotional Processing In Childbirth (EPIC) Study.

A study of women's emotional wellbeing during pregnancy and the early weeks after birth and their risks of developing postnatal depression

Dear …,

Recently I sent you the final questionnaire in the above study for completion. As we have not yet received your reply I am sending you a gentle reminder – I appreciate that at such a busy time in your life it is very easy to put the questionnaire to one side.

It may be that it is in the post, in which case I would like to thank you very much for taking the time to complete it. If you have not yet completed it I would urge you to do so. We value your contribution highly and the ultimate success and outcome of the study which will impact on the care of pregnant women in the future depends on the goodwill of women like you who agreed to participate. If you have mislaid the questionnaire and require a replacement then please contact me either by email (preferable) or phone.

If you have decided that you do not wish to take part in the final phase of the study then I respect your wish. However you have very kindly completed 2 questionnaires to date and a complete set of responses will contribute to the development of a complete picture of women's emotions during pregnancy and after childbirth.

I would like to take this opportunity to wish you and your family well with your new baby.

Yours sincerely,

Carol Wilkins
Registered Midwife and Senior Lecturer in Midwifery
Tel: 023 9228 6000 Ext 4630
E-mail: cwilkins@bournemouth.ac.uk

Appendix 4. Measurement scales

4.1 The Emotional Processing Scale (EPS)[13]

4.1.1 The EPS*

* Permission has been obtained from Professor Roger Baker to reproduce this scale within this thesis document. It is a sample copy and **not to be reproduced or copied.**

Emotional **P**rocessing **S**cale 25

INSTRUCTIONS

This questionnaire tries to understand something about your emotions and feelings. In order to fill it in you will need to fix last week firmly in your mind.

Could you first of all spend a few minutes thinking back over what you have been doing in the last week? Starting from one week ago today try to think about where you were, what you were doing, who you met or anything you may remember. If you have a diary or calendar check for any appointments or reminders of each day.

LAST WEEK…..

With the last week in mind what would you say was the ***strongest*** **positive or pleasant** emotion that you felt?

With the last week in mind what would you say was the ***strongest*** **negative or unpleasant** emotion that you felt?

[13] Baker, R. Thomas, S, Thomas PW, Owens, M. 2007. The development of an emotional processing scale. *Journal of Psychosomatic Research,* 62; 167-178.

*This questionnaire lists different descriptions of how you may have felt or acted **last week**, mostly related to negative emotional situations rather than positive. Each description has got a sliding scale under it. The scale moves from completely disagree (0) to completely agree (9). After reading each description show how much it applies to you last week by putting a circle around one of the numbers on the sliding scale.*

EXAMPLES

I kept my feelings to myself

0	1	2	3	4	5	6	7	8	9

Completely……disagree…….....in between ……agree……completely disagree agree

If you circle number 6 this will mean that you mildly agree that you ***'kept your feelings to yourself'*** last week. If this had fully described the way you were last week then you would circle number 9.

0	1	2	3	4	5	6	7	8	9

Completely……disagree…….....in between ……agree……completely disagree agree

If you circle number 0 then this would mean that you completely disagree with this description of your feelings last week.

*Now please fill in your answers based on **last week**.*

1. My emotions felt blunt/dull.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely disagree agree

2. I smothered my feelings.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely disagree agree

3. Unwanted feelings kept intruding.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely disagree agree

4. When upset or angry it was difficult to control what I said.

0	1	2	3	4	5	6	7	8	9

completely ……disagree …… in between ……..agree ……completely
disagree agree

5. I avoided looking at unpleasant things (e.g. on TV or in magazines).

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

6. I could not express my feelings.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

7. My emotional reactions lasted for more than a day.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

8. I reacted too much to what people said or did.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

9. Talking about negative feelings seemed to make them worse.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

10. My feelings did not seem to belong to me.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

11. I kept quiet about my feelings.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

12. I tended to repeatedly experience the same emotion.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

13. I wanted to get my own back on someone.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

14. I tried to talk only about pleasant things.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

15. It was hard to work out whether I felt ill or emotional.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

16. I bottled up my emotions.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

17. I felt overwhelmed by my emotions.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

18. I felt the urge to smash something.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

19. I could not tolerate unpleasant feelings.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

20. There seemed to be a big blank in my feelings.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

21. I tried not to show my feelings to others.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

22. I kept thinking about the same emotional situation again and again.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

23. It was hard for me to wind down.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

24. I tried very hard to avoid things that might make me upset.

0	1	2	3	4	5	6	7	8	9

completely ……disagree ……in between ……..agree ……completely
disagree agree

25. Sometimes I got strong feelings but I'm not sure if they were emotions.

0	1	2	3	4	5	6	7	8	9

completely disagree ……disagree ……in between ……..agree ……completely agree

Are there any other important things that you would like to add?

THANK YOU FOR YOUR HELP AND TIME IN FILLING IN THIS QUESTIONNAIRE

How to score the EPS:

The EPS can either be hand-scored or mean scores for groups can be calculated for each factor using the appropriate statistical software (i.e. SPSS)

The scores for each item are summed to produce a total score for each factor which is then divided by the number of items in each dimension (5) to produce a mean.

To calculate the total EPS score, the means for each subscale are summed and divided by the total number of items (25). These can then be compared to the table of norms for UK populations (20.1.3).

4.1.2 Emotional Processing Scale Sub-scales

Suppression:

Q2. I smothered my feelings

Q6. I could not express my feelings

Q11. I kept quiet about my feelings

Q16. I bottled up my emotions

Q21. I tried not to show my feelings to others.

Unprocessed emotions:

Q3. Unwanted feelings kept intruding

Q7. My emotional reactions lasted for more than a day

Q12. I tended to repeatedly experience the same emotion

Q17. I felt overwhelmed by my emotions

Q22. I kept thinking about the same emotional situation again and again

Unregulated emotions:

Q4. When upset or angry it was difficult to control what I said

Q8. I reacted too much to what people said or did

Q13. I wanted to get my own back on someone;

Q18. I felt the urge to smash something

Q23. It was hard for me to wind down.

Avoidance:

Q5. I avoided looking at or reading about unpleasant things

Q9. Talking about negative feelings seemed to make them worse

Q14. I tried to talk only about pleasant things

Q19. I could not tolerate unpleasant feelings

Q24. I tried very hard to avoid things that might make me upset.

Impoverished emotional experience:

Q1. My emotions felt blunt/dull

Q10. My feelings did not seem to belong to me

Q15. It was hard to work out whether I felt ill or emotional

Q20. There seemed to be a big blank in my feelings

Q25. Sometimes I got strong feelings but I'm not sure if they were emotions

4.1.3 UK Norms for EPS 25 sub-scales

NORMS (based on UK only data)						
EPS Sub-scales						
	Supp	**Unpro**	**Unreg**	**Avoid**	**Impov**	**Total**
Healthy						
25th percentile	1.8	2.4	1.8	1.8	1.2	2.2
75th percentile	4.9	5.6	4.4	4.5	3.8	4.4
Pain						
25th percentile	2.4	2.4	2.0	2.8	1.9	2.8
75th percentile	5.7	5.9	5.2	5.8	5.2	5.1
Mental Health						
25th percentile	3.8	5.0	3.0	4.0	2.6	4.0
75th percentile	6.4	7.3	6.0	6.0	5.6	5.9

Supp = suppression of emotions

Unpro – unprocessed emotions

Unreg = unregulated emotions

Avoid = avoidance

Impov = impoverished emotions

4.1.4 Calculation of thresholds for EPS

Email from Professor Peter Thomas. Received 25.8.10

Hi Carol

I met with Mariaelisa Santonastaso today to look at the issue of cut-offs for the total EPS score, to help classification of individuals into those having high scores and those having low scores.

The data we used was a mix of that already collected by the RDSU and collaborators over the years, and that collected by Mariaelisa for her PhD.

The "English" database consisted of 1014 healthy individuals, and 211 people with mental health problems.

If you have any queries about how the data were collected, or how mental health problems were defined, then (Professor Roger Baker) and/ or Mariaelisa would have the details.

In the healthy group, mean (SD) total EPS was 3.66 (1.48).
In the mental health group, mean (SD) was 4.64 (1.66).

So EPS is about 1 scale point higher in the mental health group than the healthy group. Although there is a clear difference in average scores between the 2 groups, it is also clear (given the SDs of around 1.5) that there is a lot of overlap between the EPS scores in the 2 groups.

I have used ROC (Receiver Operating Characteristic) curves and Youden's Index to help inform the choice of cut-off point. The principle is that the cut-off should maximize the sensitivity and specificity of the EPS. Sensitivity focuses on those in the mental health group, and is the proportion of such patients who have a high score on the EPS (as defined by the cut-off). Specificity focuses on the healthy group, and is the proportion of such patients who have low scores on the EPS (as defined by the cut-off). I have assumed that a high sensitivity and high specificity are equally important.

The analysis concludes that a cut off point of 4.6 or greater is the best. This gave a sensitivity of 57%, and a specificity of 73%. Thus 57% of the mental health group had high scores, and 73% of the healthy group had low scores. The specificity also implies that in a healthy group you might expect 27% to have high values.

I need to add that the advantage of the cut-off of 4.6 over other possible cut-offs is pretty marginal. For example, a cut off of 4 gave sensitivity and specificity of 70% and 59% respectively. For a cut-off of 5 the figures were 44% and 82% respectively. Youden's index is (sensitivity+specificity-100); the higher the value the better. For cut-offs of 4, 4.6 and 5 Youden's index is 28%, 30%, and 26% respectively – very little in it. So a robust defence of 4.6 over any other cut-off like 4 or 5 wouldn't be appropriate.

However, I do think that 4.6 is useful as an evidence based, defendable cut-off for your analysis (much, much better than an arbitrary guess). It would be interesting first of all to compare the average in your sample to that in this healthy sample, and to apply the cut-off of 4.6 to see what proportion are identified as high (and how that compares to the 27% in the healthy group).

Best wishes

Pete

4.2 The Edinburgh Postnatal Depression Scale (EPDS)[14]

How are you feeling?

As you have recently had a baby we would like to know how you are feeling now. Please underline the answer which comes closest to how you have felt in the past 7 days, not just how you feel today. Here is an example, already completed:

I have felt happy:

Yes, most of the time
Yes, some of the time
No, not very often
No, not at all

This would mean: 'I have felt happy some of the time during the past week'. Please complete the other questions in the same way.

In the past 7 days….

1. I have been able to laugh and see the funny side of things:

As much as I always could
Not quite so much now
Definitely not so much now
Not at all

2. I have looked forward with enjoyment to things:

As much as I ever did
Rather less than I used to
Definitely less than I used to
Hardly at all

[14] Cox, JL, Holden, JM, Sagovsky, R. 1987. Detection of postnatal depression: development of the 10-item Edinburgh Postnatal Depression Scale. *British Journal of Psychiatry*, 150; 782-786.

3. I have blamed myself unnecessarily when things went wrong *

Yes, most of the time

Yes, some of the time

Not very often

No, never

4. **I have been anxious or worried for no good reason**

No, not at all

Hardly ever

Yes, sometimes

Yes, very often

5. **I have felt scared or panicky for no very good reason ***

Yes, quite a lot

Yes, sometimes

No, not much

No, not at all

6. **Things have been getting on top of me ***

Yes, most of the time I haven't been able to cope at all

Yes, sometimes I haven't been coping as well as usual

No, most of the time I have coped quite well

No. I have been coping as well as ever

7. I have been so unhappy that I have had difficulty sleeping *

Yes, most of the time

Yes, sometimes

Not very often

No, not at all

8. I have felt sad or miserable *

Yes, most of the time

Yes, quite often

Not very often

No, not at all

9. I have been so unhappy that I have been crying *

Yes, most of the time

Yes, quite often

Only occasionally

No, never

10. The thought of harming myself has occurred to me *

Yes, quite often

Sometimes

Hardly ever

Never

Scoring:

Items are scored from 0 to 3: the normal response scores 0 and the 'severe' response scores 3. Items 1, 2 and 4 are scored in the order 0 to 3. Items 3, 5, 6, 7, 8, 9, 10 are scored in the order of 3 to 0.

Total the individual item scores. A score of 12 or above is an indicator that the individual should be assessed further. Some authorities prefer a lower cut-off to ensure that depression is not missed.

Scores alone should not replace clinical judgement: women should be further assessed before deciding on treatment.

4.3 The Short-Form 36 (SF-36)[15]

Your Health and Well-Being

This survey asks for your views about your health. This information will help keep track of how you feel and how well you are able to do your usual activities. ***Thank you for completing this survey!***

For each of the following questions, please tick the one box that best describes your answer.

1. In general, would you say your health is:

Excellent	Very good	Good	Fair	Poor
☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

2. <u>Compared to one year ago</u>, how would you rate your health in general <u>now</u>?

Much better now than one year ago	Somewhat better now than one year ago	About the same as one year ago	Somewhat worse now than one year ago	Much worse now than one year ago
☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

[15] Ware, JE, Sherbourne, CD. 1992. The MOS 36-item Short-Form Health Survey (SF-36). *Medical Care*, 30, 6; 473-483

3. The following questions are about activities you might do during a typical day. Does <u>your health now limit you</u> in these activities? If so, how much?

	Yes, limited a lot	Yes, limited a little	No, not limited at all
a Vigorous activities, such as running, lifting heavy objects, participating in strenuous sports	☐ 1	☐ 2	☐ 3
b Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf	☐ 1	☐ 2	☐ 3
c Lifting or carrying groceries	☐ 1	☐ 2	☐ 3
d Climbing several flights of stairs	☐ 1	☐ 2	☐ 3
e Climbing one flight of stairs	☐ 1	☐ 2	☐ 3
f Bending, kneeling, or stooping	☐ 1	☐ 2	☐ 3
g Walking more than a mile	☐ 1	☐ 2	☐ 3
h Walking several hundred yards	☐ 1	☐ 2	☐ 3
i Walking one hundred yards	☐ 1	☐ 2	☐ 3
j Bathing or dressing yourself	☐ 1	☐ 2	☐ 3

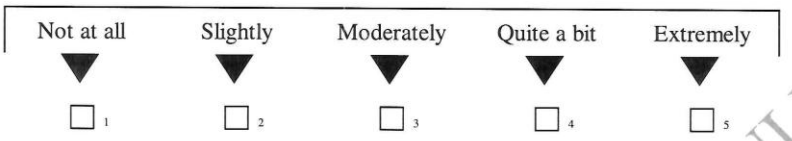
4. During the past 4 weeks, how much of the time have you had any of the following problems with your work or other regular daily activities as a result of your physical health?

	All of the time	Most of the time	Some of the time	A little of the time	None of the time
a Cut down on the amount of time you spent on work or other activities	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
b Accomplished less than you would like	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
c Were limited in the kind of work or other activities	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
d Had difficulty performing the work or other activities (for example, it took extra effort)	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

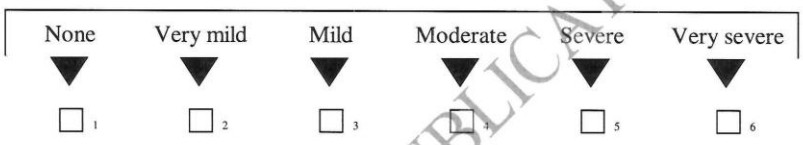
5. During the past 4 weeks, how much of the time have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?

	All of the time	Most of the time	Some of the time	A little of the time	None of the time
a Cut down on the amount of time you spent on work or other activities	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
b Accomplished less than you would like	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
c Did work or other activities less carefully than usual	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

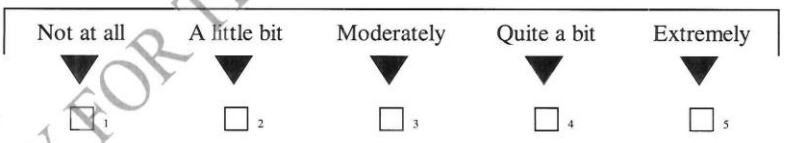
6. **During the <u>past 4 weeks</u>, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbours, or groups?**



7. **How much <u>bodily</u> pain have you had during the <u>past 4 weeks</u>?**



8. **During the <u>past 4 weeks</u>, how much did <u>pain</u> interfere with your normal work (including both work outside the home and housework)?**



9. These questions are about how you feel and how things have been with you during the past 4 weeks. For each question, please give the one answer that comes closest to the way you have been feeling. How much of the time during the past 4 weeks…

	All of the time	Most of the time	Some of the time	A little of the time	None of the time
a Did you feel full of life?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
b Have you been very nervous?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
c Have you felt so down in the dumps that nothing could cheer you up?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
d Have you felt calm and peaceful?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
e Did you have a lot of energy?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
f Have you felt downhearted and low?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
g Did you feel worn out?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
h Have you been happy?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
i Did you feel tired?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

10. During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting with friends, relatives, etc.)?

All of the time	Most of the time	Some of the time	A little of the time	None of the time
☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

11. How TRUE or FALSE is <u>each</u> of the following statements for you?

	Definitely true	Mostly true	Don't know	Mostly false	Definitely false
a I seem to get ill more easily than other people	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
b I am as healthy as anybody I know	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
c I expect my health to get worse	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
d My health is excellent	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

Thank you for completing these questions!

Scoring:

QualityMetric provides a scoring software programme with the product licence enabling the use of formulae to calculate individual sub-scale scores, standardise them, aggregate these scores and calculate summary scores.

4.4 The Rosenberg Self-Esteem Scale (RSE)[16]

The scale is a ten-item Likert scale with each items having four optional responses – from strongly agree to strongly disagree. The original sample for which the scale was developed consisted of 5,024 High School Juniors and Seniors from 10 randomly selected schools in New York State

Instructions:

Below is a list of statements dealing with your general feelings about yourself. If you strongly agree, circle **SA**. If you agree with the statement, circle **A**. If you disagree, circle **D**. If you strongly disagree, circle **SD**

1. On the whole I am satisfied with myself	**SA**	**A**	**D**	**SD**
2. At times I think I am no good at all *	**SA**	**A**	**D**	**SD**
3. I feel I have a number of good qualities	**SA**	**A**	**D**	**SD**
4. I am able to do things as well as most people	**SA**	**A**	**D**	**SD**
5. I feel I do not have much to be proud of *	**SA**	**A**	**D**	**SD**
6. I certainly feel useless at times *	**SA**	**A**	**D**	**SD**
7. I feel that I am a person of worth, at least on an equal plane with others	**SA**	**A**	**D**	**SD**
8. I wish I could have more respect for myself *	**SA**	**A**	**D**	**SD**
9. All in all, I am inclined to feel that I am a failure *	**SA**	**A**	**D**	**SD**
10. I take a positive attitude towards myself	**SA**	**A**	**D**	**SD**

Scoring: SA = 3, A = 2, D = 1, SD = 0. Items with an asterisk (*) are reverse scored, that is SA = 0, A = 1, D = 2, SD = 3.

Sum the scores for the 10 items. The higher the score, the higher the self-esteem.

There are no discrete cut-offs to delineate high and low esteem. It is recommended that you consult your literature relevant to the population being studied to learn more about norms for that specific population

[16] Rosenberg, M. 1989. *Society and the Adolescent Self-Image.* Revised Edition. Middeltown, CT. Wesleyan University Press

Appendix 5. Frequency of individual EPS and EPDS scores

5.1 Frequency of scores on each EPS question

5.1.1 The EPS 1

Key: * CD – completely disagree, D – disagree, In bet – in between, A – agree, CA – completely agree

Emotional experience	Scores										
	0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Total**
	CD*		**D***			**In bet***			**A***	**CA***	
	N	N	N	N	N	N	N	N	N	N	N
	%	%	%	%	%	%	%	%	%	%	
1. My emotions felt blunt/dull	283	103	195	86	87	93	50	54	8	7	966
	29.3	10.7	20.2	8.9	9.0	9.6	5.2	5.6	0.8	0.7	
2. I smothered feelings	280	106	193	78	83	101	57	49	5	7	959
	29.2	11.1	20.1	8.1	8.7	10.5	5.9	5.1	0.5	0.7	
3. Unwanted feelings kept intruding	254	72	150	75	99	86	79	100	30	18	963
	26.4	7.5	15.6	7.8	10.3	8.9	8.2	10.4	3.1	1.9	
4. When upset or angry it was difficult to control what said	181	79	160	79	81	66	75	144	48	53	966
	18.7	678.2	16.6	8.2	8.4	6.8	7.8	14.9	5.0	5.5	
5. I avoided looking at unpleasant things	227	67	188	63	76	71	52	131	41	51	967
	23.5	6.9	19.4	6.5	7.9	7.3	5.4	13.5	4.2	5.3	
6. I could not express my feelings	292	107	241	68	59	71	51	47	17	13	966
	30.2	11.1	24.9	7.0	6.1	7.3	5.3	4.9	1.8	1.3	
7. My emotional reactions lasted for more than a day	327	102	170	60	66	69	48	77	24	22	965
	33.9	10.6	17.6	6.2	6.8	7.2	5.0	8.0	2.5	2.3	
8. I reacted too much to what people said or did	160	75	152	81	107	96	77	143	47	27	965
	16.6	7.8	15.8	8.4	11.1	9.9	8.0	14.8	4.9	2.8	
9. Talking about negative feelings seemed to make them worse	245	105	205	76	88	82	57	82	13	11	964
	25.4	10.9	21.3	7.9	9.1	8.5	5.9	8.5	1.3	1.1	
10. My feelings did not seem to belong to me	346	94	196	64	73	68	43	56	12	11	963
	35.9	9.8	20.4	6.6	7.6	7.1	4.5	5.8	1.2	1.1	

11. I kept quiet about my feelings	268	96	201	74	90	75	52	64	27	16	963
	27.8	10.0	20.9	7.7	9.3	7.8	5.4	6.6	2.8	1.7	
12. I tended to repeatedly experience same emotion	207	73	142	67	114	86	72	142	35	27	965
	21.5	7.6	14.7	6.9	11.8	8.9	7.5	14.7	3.6	2.8	
13. I wanted to get my own back on someone	506	73	178	37	37	38	31	32	10	17	959
	52.8	7.6	18.6	3.9	3.9	4.0	3.2	3.3	1.0	1.8	
14. I tried to talk only about pleasant things	225	60	167	91	143	117	61	70	9	21	964
	23.3	6.2	17.3	9.4	14.8	12.1	6.3	7.3	.9	2.2	
15. It was hard for me to work out whether I felt ill or emotional	307	89	186	55	85	77	49	81	17	19	965
	31.8	9.2	19.3	5.7	8.8	8.0	5.1	8.4	1.8	2.0	
16. I bottled up my emotions	320	104	206	62	76	66	38	52	21	19	964
	32.9	10.7	21.1	6.4	7.8	6.8	3.9	5.3	2.2	2.0	
17. I felt overwhelmed by my emotions	223	70	161	82	98	90	82	96	27	33	962
	23.2	7.3	16.7	8.5	10.2	9.4	8.5	10.0	2.8	3.4	
18. I felt the urge to smash something	496	77	162	36	29	38	28	51	18	27	962
	51.6	8.0	16.8	3.7	3.0	4.0	2.9	5.3	1.9	2.8	
19. I could not tolerate unpleasant feelings	344	98	175	82	72	75	45	53	6	13	963
	35.7	10.2	18.2	8.5	7.5	7.8	4.7	5.5	.6	1.3	
20. There seemed to be a big blank in my feelings	416	121	197	53	53	52	30	30	9	2	963
	43.2	12.6	20.5	5.5	5.5	5.4	3.1	3.1	.9	.2	
21. I tried not to show my feelings to others	287	87	173	81	96	79	61	66	15	19	964
	29.8	9.0	17.9	8.4	10.0	8.2	6.3	6.8	1.6	2.0	
22. I kept thinking about same emotional situation again & again	276	92	165	46	86	71	68	98	34	31	967
	28.5	9.5	17.1	4.8	8.9	7.3	7.0	10.1	3.5	3.2	
23. It was hard for me to wind down	231	81	159	73	96	85	68	104	40	29	966
	23.9	8.4	16.5	7.6	9.9	8.8	7.0	10.8	4.1	3.0	
24. I tried hard to avoid things that might make me upset	222	85	167	86	109	89	66	103	17	20	964
	23.0	8.8	17.3	8.9	11.3	9.2	6.8	10.7	1.8	2.1	
25. Sometimes I got strong feelings but not sure if they were emotions	297	107	196	72	95	98	36	50	5	6	962
	30.9	11.1	20.4	7.5	9.9	10.2	3.7	5.2	.5	.6	

5.1.2 The EPS 2

Key: * CD – completely disagree, D – disagree, In bet – in between, A – agree, CA – completely agree

	Scores										
	0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Total**
	CD*		**D***			**In bet***	**A***		**CA***		**CD***
Emotional experience	N %	N %	N %	N %	N %	N %	N %	N %	N %	N %	N
1.My emotions felt blunt/dull	213 30.2	76 10.8	166 23.5	62 8.8	54 7.7	57 8.1	44 6.2	24 3.4	3 .4	6 .9	705
2. I smothered feelings	190 27.0	71 10.1	168 23.8	82 11.6	62 8.8	51 7.2	32 4.5	38 5.4	7 1.0	4 .6	705
3. Unwanted feelings kept intruding	188 26.6	80 11.3	131 18.5	71 10.0	47 6.6	52 7.3	49 6.9	62 8.8	14 2.0	14 2.0	708
4. When upset or angry it was difficult to control what said	138 19.5	69 9.7	125 17.7	52 7.3	79 11.2	50 7.1	65 9.2	90 12.7	19 2.7	21 3.0	708
5. I avoided looking at unpleasant things	162 22.9	66 9.3	116 16.4	46 6.5	63 8.9	57 8.1	43 6.1	102 14.4	15 2.1	38 5.4	708
6. I could not express my feelings	217 30.7	83 11.7	161 22.8	57 8.1	53 7.5	57 8.1	29 4.1	35 5.0	6 .8	9 1.3	707
7. My emotional reactions lasted for more than a day	252 35.6	71 10.0	135 19.1	44 6.2	47 6.6	37 5.2	36 5.1	51 7.2	14 2.0	20 2.8	707
8. I reacted too much to what people said or did	108 15.3	64 9.0	146 20.6	58 8.2	86 12.1	59 8.3	73 10.3	76 10.7	16 2.3	22 3.1	708
9. Talking about negative feelings seemed to make them worse	172 24.3	79 11.1	170 24.0	62 8.7	57 8.0	60 8.5	36 5.1	55 7.8	9 1.3	9 1.3	709
10. My feelings did not seem to belong to me	245 34.6	72 10.2	166 23.4	56 7.9	48 6.8	42 5.9	27 3.8	39 5.5	5 .7	8 1.1	708
11. I kept quiet about my feelings	195 27.6	68 9.6	162 22.9	63 8.9	64 9.1	49 6.9	31 4.4	46 6.5	17 2.4	11 1.6	706

12. I tended to repeatedly experience the same emotion	144 20.3	64 9.0	115 16.2	56 7.9	78 11.0	69 9.7	53 7.5	86 12.1	29 4.1	14 2.0	708
13. I wanted to get my own back on someone	374 52.8	69 9.7	138 19.5	27 3.8	17 2.4	26 3.7	19 2.7	22 3.1	8 1.1	8 1.1	708
14. I tried to talk only about pleasant things	152 21.4	49 6.9	164 23.1	74 10.4	100 14.1	65 9.2	36 5.1	49 6.9	13 1.8	7 1.0	709
15. It was hard for me to work out whether I felt ill or emotional	253 35.7	74 10.5	157 22.2	40 5.6	43 6.1	38 5.4	41 5.8	4.3 6.1	11 1.6	8 1.1	708
16. I bottled up my emotions	224 31.6	67 9.5	163 23.0	51 7.2	49 6.9	59 8.3	34 4.8	48 5.2	10 1.4	14 2.0	708
17. I felt overwhelmed by my emotions	163 23.1	67 9.5	132 18.7	49 6.9	67 9.5	62 8.8	43 6.1	85 12.0	19 2.7	20 2.8	707
18. I felt the urge to smash something	363 51.3	58 8.2	116 16.4	28 4.0	31 4.4	32 4.5	26 3.7	30 4.2	9 1.3	15 2.1	708
19. I could not tolerate unpleasant feelings	248 34.9	86 12.1	150 21.1	49 6.9	46 6.5	55 7.7	32 4.5	35 4.9	4 .6	5 .7	710
20. There seemed to be a big blank in my feelings	315 44.4	92 13.0	156 22.0	42 5.9	37 5.2	34 4.8	8 1.1	15 2.1	6 .8	4 .6	709
21. I tried not to show my feelings to others	207 29.2	70 9.9	136 19.2	61 8.6	73 10.3	47 6.6	45 6.3	45 6.3	11 1.6	14 2.0	709
22. I kept thinking about same emotional situation again & again	186 26.3	62 8.8	126 17.8	50 7.1	69 9.8	54 7.6	39 5.5	75 10.6	26 3.7	20 2.8	707
23. It was hard for me to wind down	137 19.4	56 7.9	119 16.8	52 7.4	71 10.0	76 10.7	56 7.9	83 11.7	28 4.0	29 4.1	707
24. I tried hard to avoid things that might make me upset	147 20.8	57 8.1	151 21.4	55 7.8	65 9.2	81 11.5	54 7.6	70 9.9	12 1.7	14 2.0	706
25. Sometimes I got strong feelings but not sure if they were emotions	206 29.1	81 11.5	173 24.5	58 8.2	58 8.2	65 9.2	28 4.0	30 4.2	2 .3	6 .8	707

5.1.3 The EPS 3

Key: * CD – completely disagree, D – disagree, In bet – in between, A – agree, CA – completely agree

Emotional experience	Scores										
	0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Total**
	CD*		**D***			**In bet***	**A***		**CA***		**CD***
	N	N	N	N	N	N	N	N	N	N	
	%	%	%	%	%	%	%	%	%	%	
1. My emotions felt blunt/dull	186	70	133	42	34	35	25	20	4	4	553
	33.6	12.7	24.1	7.6	6.1	6.3	4.5	3.6	.7	.7	
2. I smothered feelings	158	51	125	58	50	33	37	31	6	4	553
	28.6	9.2	22.6	10.5	9.0	6.0	6.7	5.6	1.1	.7	
3. Unwanted feelings kept intruding	166	72	101	45	37	46	26	39	10	10	552
	30.1	13.0	18.3	8.2	6.7	8.3	4.7	7.1	1.8	1.8	
4. When upset or angry it was difficult to control what said	109	63	113	36	60	44	40	59	12	18	554
	19.7	11.4	20.4	6.5	10.8	7.9	7.2	10.6	2.2	3.2	
5. I avoided looking at unpleasant things	191	48	100	36	25	33	28	55	16	21	553
	34.5	8.7	18.1	6.5	4.5	6.0	5.1	9.9	2.9	3.8	
6. I could not express my feelings	165	53	128	56	40	46	30	23	3	10	554
	29.8	9.6	23.1	10.1	7.2	8.3	5.4	4.2	.5	1.8	
7. My emotional reactions lasted for more than a day	207	63	113	36	33	28	18	34	8	13	553
	37.4	11.4	20.4	6.5	6.0	5.1	3.3	6.1	1.4	2.4	
8. I reacted too much to what people said or did	84	51	108	65	66	60	43	52	14	11	554
	15.2	9.2	19.5	11.7	11.9	10.8	7.8	9.4	2.5	2.0	
9. Talking about negative feelings seemed to make them worse	177	57	157	36	34	29	25	27	5	6	553
	32.0	10.3	28.4	6.5	6.1	5.2	4.5	4.9	.9	1.1	
10. My feelings did not seem to belong to me	215	60	126	39	39	27	14	22	3	7	552
	38.9	10.9	22.8	7.1	7.1	4.9	2.5	4.0	.5	1.3	
11. I kept quiet about my feelings	159	42	122	47	56	48	27	32	8	12	553
	28.8	7.6	22.1	8.5	10.1	8.7	4.9	5.8	1.4	2.2	

12. I tended to repeatedly experience the same emotion	132 23.9	41 7.4	96 17.4	36 6.5	58 10.5	52 9.4	40 7.2	72 13.0	12 2.2	14 2.5	553
13. I wanted to get my own back on someone	322 58.2	53 9.6	104 18.8	16 2.9	19 3.4	12 2.2	13 2.4	9 1.6	4 .7	1 .2	553
14. I tried to talk only about pleasant things	178 32.2	37 6.7	128 23.1	41 7.4	59 10.7	49 8.9	29 5.2	24 4.3	3 .5	5 .9	553
15. It was hard for me to work out whether I felt ill or emotional	255 46.2	53 9.6	128 23.2	28 5.1	21 3.8	19 3.4	15 2.7	18 3.3	9 1.6	6 1.1	552
16. I bottled up my emotions	197 35.6	48 8.7	101 18.3	45 8.1	47 8.5	34 6.1	37 6.7	24 4.3	7 1.3	13 2.4	553
17. I felt overwhelmed by my emotions	140 25.3	60 10.8	83 15.0	53 9.6	41 7.4	45 8.1	35 6.3	60 10.8	16 2.9	20 3.6	553
18. I felt the urge to smash something	318 57.5	34 6.1	80 14.5	21 3.8	14 2.5	21 3.8	22 4.0	17 3.1	10 1.8	16 2.9	553
19. I could not tolerate unpleasant feelings	236 42.7	57 10.3	112 20.3	33 6.0	34 6.1	27 4.9	28 5.1	18 3.3	2 .4	6 1.1	553
20. There seemed to be a big blank in my feelings	298 53.8	64 11.6	95 17.1	23 4.2	26 4.7	20 3.6	15 2.7	10 1.8	1 .2	2 .4	554
21. I tried not to show my feelings to others	178 32.2	46 8.3	94 17.0	45 8.1	47 8.5	42 7.6	36 6.5	43 7.8	10 1.8	12 2.2	553
22. I kept thinking about same emotional situation again & again	210 37.9	42 7.6	97 17.5	38 6.9	30 5.4	40 7.2	18 3.2	51 9.2	15 2.7	13 2.3	554
23. It was hard for me to wind down	90 16.3	48 8.7	96 17.4	40 7.3	49 8.9	55 10.0	37 6.7	87 15.8	26 4.7	23 4.2	551
24. I tried hard to avoid things that might make me upset	161 29.2	48 8.7	118 21.4	37 6.7	44 8.0	53 9.6	31 5.6	43 7.8	7 1.3	10 1.8	552
25. Sometimes I got strong feelings but not sure if they were emotions	228 41.5	42 7.6	133 24.2	28 5.1	38 6.9	45 8.2	17 3.1	17 3.1	1 .2	1 .2	550

5.2 Frequency of scores on each EPDS question

5.2.1 EPDS 1

Scores					
Question	**0**	**1**	**2**	**3**	**Total**
	N %	N %	N %	N %	
1. I have been able to laugh and see the funny side of things	As much as I always could	Not quite so much now	Definitely not so much now	Not at all	
	672 69.5	243 25.1	45 4.7	7 0.7	967
2. I have look forward with enjoyment to things	As much as I ever did	Rather less than I used to	Definitely less than I used to	Hardly at all	
	682 70.5	218 22.5	56 5.8	11 1.1	967
3. I have blamed myself unnecessarily when things went wrong *	No never	Not very often	Yes some of the time	Yes most of the time	
	217 22.5	395 40.9	297 30.7	57 5.9	966
4. I have been anxious or worried for no good reason	No not at all	Hardly ever	Yes sometimes	No not at all	
	245 25.3	226 23.3	421 43.5	76 7.9	968
5. I have felt scared or panicky for no very good reason *	No not at all	No not much	Yes sometimes	Yes quite a lot	
	367 37.9	288 29.8	259 26.8	54 5.6	968
6. Things have been getting on top of me *	No I have been coping as well as ever	No most of the time I have coped quite well	Yes sometimes I haven't been coping as well as usual	Yes most of the time I haven't been able to cope at all	
	243 25.2	385 39.9	301 31.2	37 3.8	966
7. I have been so unhappy that I have had difficulty sleeping *	No not at all	Not very often	Yes sometimes	Yes most of the time	
	556 57.6	228 23.6	150 15.5	32 3.3	966

8. I have felt sad or miserable *	No not at all	Not very often	Yes quite often	Yes most of the time	
	337 34.8	416 43.0	181 18.7	34 3.5	968
9. I have been so unhappy that I have been crying *	No never	Only occasion ally	Yes quite often	Yes most of the time	
	459 47.4	424 43.8	68 7.0	17 1.8	968
10. The thought of harming myself has occurred to me *	Never	Hardly ever	sometimes	Yes quite often	
	921 95.1	36 3.7	8 0.8	3 0.3	968

* These scores have been reversed

5.2.2 EPDS 2

	Scores				
	0	**1**	**2**	**3**	**Total**
Question	N %	N %	N %	N %	
1. I have been able to laugh and see the funny side of things	As much as I always could	Not quite so much now	Definitely not so much now	Not at all	
	528 74.4	149 21.0	32 4.5	1 0.1	710
2. I have look forward with enjoyment to things	As much as I ever did	Rather less than I used to	Definitely less than I used to	Hardly at all	
	524 73.8	146 20.6	30 4.2	10 1.4	710
3. I have blamed myself unnecessarily when things went wrong *	No never	Not very often	Yes some of the time	Yes most of the time	
	147 20.7	321 45.1	198 27.8	45 6.3	711

4. I have been anxious or worried for no good reason	No not at all	Hardly ever	Yes sometimes	No not at all	
	187 26.3	218 30.7	269 37.8	37 5.2	711
5. I have felt scared or panicky for no very good reason *	No not at all	No not much	Yes sometimes	Yes quite a lot	
	291 41.	218 30.7	172 24.3	28 3.9	709
6. Things have been getting on top of me *	No I have been coping as well as ever	No most of the time I have coped quite well	Yes sometimes I haven't been coping as well as usual	Yes most of the time I haven't been able to cope at all	
	157 22.1	302 42.5	227 32.0	24 3.4	710
7. I have been so unhappy that I have had difficulty sleeping *	No not at all	Not very often	Yes sometimes	Yes most of the time	
	427 60.2	172 24.3	84 11.8	26 3.7	709
8. I have felt sad or miserable *	No not at all	Not very often	Yes quite often	Yes most of the time	
	236 33.2	332 46.8	118 16.6	24 3.4	710
9. I have been so unhappy that I have been crying *	No never	Only occasionally	Yes quite often	Yes most of the time	
	349 49.2	296 41.7	52 7.3	13 1.8	710
10. The thought of harming myself has occurred to me *	Never	Hardly ever	sometimes	Yes quite often	
	671 94.5	27 3.8	9 1.3	3 0.4	710

* These scores have been reversed

5.2.3 EPDS 3

Scores					
	0	**1**	**2**	**3**	**Total**
Question	N %	N %	N %	N %	
1. I have been able to laugh and see the funny side of things	As much as I always could	Not quite so much now	Definitely not so much now	Not at all	
	416 75.2	106 19.2	26 4.7	5 0.9	553
2. I have look forward with enjoyment to things	As much as I ever did	Rather less than I used to	Definitely less than I used to	Hardly at all	
	429 77.6	100 18.1	17 3.1	7 1.3	553
3. I have blamed myself unnecessarily when things went wrong *	No never	Not very often	Yes some of the time	Yes most of the time	
	117 21.	203 36.7	195 35.3	38 6.9	553
4. I have been anxious or worried for no good reason	No not at all	Hardly ever	Yes sometimes	No not at all	
	167 30.2	161 29.1	198 35.8	27 4.9	553
5. I have felt scared or panicky for no very good reason*	No not at all	No not much	Yes sometimes	Yes quite a lot	
	274 49.5	150 27.1	115 20.8	14 2.5	553
6. Things have been getting on top of me *	No I have been coping as well as ever	No most of the time I have coped quite well	Yes sometimes I haven't been coping as well as usual	Yes most of the time I haven't been able to cope at all	
	102 18.4	265 47.9	171 30.9	15 2.7	553

7. I have been so unhappy that I have had difficulty sleeping *	No not at all	Not very often	Yes sometimes	Yes most of the time	
	410 74.1	94 17.0	41 7.4	8 1.4	553
8. I have felt sad or miserable *	No not at all	Not very often	Yes quite often	Yes most of the time	
	171 30.9	290 52.4	75 13.6	17 3.1	553
9. I have been so unhappy that I have been crying *	No never	Only occasionally	Yes quite often	Yes most of the time	
	241 43.6	254 45.9	49 8.9	9 1.6	553
10. The thought of harming myself has occurred to me *	Never	Hardly ever	sometimes	Yes quite often	
	532 96.2	12 2.2	7 1.3	2 0.4	553

* These scores have been reversed

Appendix 6. Mixed models analysis

The linear mixed-effects models (mixed) procedure was undertaken to address the problem of data missing from unreturned questionnaires. This method is used in studies where there are repeated measurements taken from a cohort of respondents so that participants who have contributed data to part of the study and not the whole do not have to be excluded from analysis involving all time points.

Data were prepared for mixed modelling by using the SPSS 'restructure' data wizard to change the repeated observations from a 'one subject per row' format to one in which the observations for a subject were encoded in three separate rows.

6.1 Mixed models analysis applied to EPS scores

Results from the type III tests for fixed effects in mixed model analysis showed that there were significant changes over time in the mean scores of the EPS 1, 2 and 3 (p = 0.01). The estimate of fixed effects table illustrates that compared to the mean scores of the EPS 3 there was a significantly higher mean difference of 0.17 in EPS 1 scores (95% CI 0.05 to 0.29, p=0.005) and a significantly higher mean difference of 0.16 in EPS 2 scores (95% CI 0.04 to 0.29, p=0.009).

Type III Tests of Fixed Effects[a]

Source	Numerator df	Denominator df	F	Sig.
Intercept	1	985.4109	2671.9216	.000
Index1	2	1345.26	4.62	.010

a. Dependent Variable: EPS 1 total.

Estimates of Fixed Effects[b]

Parameter	Estimate	Std. Error	df	t	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Intercept	2.56	.067	1972.91	38.15	.000	2.42	2.68
[Index1=1]	.17	.06	1377.37	2.80	.005	.05	.29
[Index1=2]	.16	.06	1297.60	2.63	.009	.04	.29
[Index1=3]	0[a]	0	.	.	.	.	.

b. Dependent Variable: EPS 1 total

6.2 Mixed models analysis applied to EPDS scores

Results from the type III tests for fixed effects in mixed model analysis of EPDS scores showed that there were no significant changes over time in the mean scores of the EPDS 1, 2 and 3 (p = 0.31).

Type III Tests of Fixed Effects[a]

Source	Numerator df	Denominator df	F	Sig.
Intercept	1	977.165	2456.651	.000
Index1	2	1355.351	1.165	.312

a. Dependent Variable: EPDS Q1 total.

Estimates of Fixed Effects[b]

Parameter	Estimate	Std. Error	df	t	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Intercept	7.38	.20	2030.47	36.45	.000	6.98	7.77
[Index1=1]	.29	.19	1390.57	1.53	.128	-.083	.66
[Index1=2]	.17	.20	1305.24	.86	.391	-.22	.55
[Index1=3]	0[a]	0	.	.	.	.	.

b. Dependent Variable: EPDS Q1 total.

Appendix 7. EPIC publications and conferences presentations

The following peer reviewed publications and conference presentations have originated from the current study

Publications:

Wilkins, C. 2009. Emotional Processing: a predictor of postnatal depression? *British Journal of Midwifery*, 17 (3); 154 – 159.

Ryan, K., Brown, S., **Wilkins, C**., Taylor, A., Arnold, R., Angell, C., vanTeijlingen, E. 2010. Which hat am I wearing today? Practising midwives doing research. *Evidence Based Midwifery,* 9(1); 4 – 8.

Conferences:

Wilkins, C. Emotional Processing in Childbirth (EPIC): An enquiry into the relationship between emotional processing and postnatal depression in childbearing women. 2008. *International Confederation of Midwives 28th Triennial Congress,* Glasgow, 1 – 5 June 2008.

Wilkins, C. Emotional Processing in Childbirth. Poster presentation. *23rd Annual Conference of The European Health Psychology Society*, Pisa, Italy. September 2009.

GLOSSARY

Body Attitudes Questionnaire (**BAQ)** (Ben-Tovim and Walker 1991)
This is a 44- item self-report questionnaire divided into six subscales that measures a woman's attitude towards her own body. The BAQ is used in the assessment of eating disorders.

Beck Depression Inventory (**BDI-1, BDI-11)** (Beck 1961, 1996)
This is a 21-item multiple-choice self-report inventory used widely as an assessment tool by health care professionals and researchers. The original BDI was first published in 1961 and the revised version, the BDI-II, was developed in 1996 following the publication of guidance in the DSM-IV (see below).

Brisbane Postnatal Depression Index (**PDI)** (Webster et al. 2003, 2006)
This is an index validated for use in maternity settings to identify women who may be at risk for postnatal depression.

California Q-set Alexithymia Prototype (**CAQ-AP)** (Haviland and Reise 1996)
This is a self and observer-rated 20-item measure of the alexithymia construct based on the categorisation of cognition and behaviours deemed by experts to be characteristic of the alexithymia condition.

Centre for Epidemiologic Studies Depression Scale (**CES-D)** (Radloff 1977)
This is a 20-item self-report scale designed by to measure depressive symptomatology in the general population. Scores suggest mild to moderate or major depression.

Centre for Maternal and Child Enquiries (CMACE)
CMACE replaced CEMACH in 2009. The organisation produces a triennial report of the national confidential enquiry into the deaths of women during pregnancy

and up to 42 days after delivery. It has now added obesity in pregnancy to the confidential enquiries it conducts.

Clinical Interview Schedule (**CIS)** (Goldberg et al. 1970, Lewis et al. 1992)

The CIS was designed to be used by clinically experienced interviewers such as psychiatrists. It was revised and standardised into a fully structured interview (CIS-R) to make it suitable to be used by other trained interviewers and researchers in assessing minor psychiatric morbidity in the community, hospital, occupational and primary care research. ICD-10 diagnoses can be derived for the CIS-R data.

Confidential Enquiry into Maternal and Child Health (CEMACH)

This was a self-governing body, comprising six United Kingdom Royal Colleges (Obstetricians and Gynaecologists, Midwives, Paediatrics and Child Health, Pathologists, Anaesthetists and Public Health) that was established in 2003 and funded mainly by NICE (see below). It ran a series of confidential enquiries into maternal death, perinatal mortality, diabetes in pregnancy and very premature birth outcomes.

Coopersmith Self-Esteem Inventory (**CSEI)** (Coopersmith 1959)

This is a self-report questionnaire designed to measure evaluative attitudes toward the self that one holds in social, academic, family, and personal areas of experiences. Originally designed for use with children the adult version consists of 50 generally favourable or unfavourable aspects of a person which the respondent identifies are "like me" or "not like me".

Crown Crisp Experiential Index (**CCEI)** (Crisp et al. 1978)

Previously known as the Middlesex Hospital Questionnaire, this is a widely used measure of six different kinds of neurotic traits and symptoms.

Day Reconstruction Method (DRM) (Kahneman et al. 2004)

This is an approach to assessing wellbeing and satisfaction with life. Respondents complete a self-administered questionnaire in which they systematically reconstruct the previous day to show how they experienced various activities and settings in their life.

Diagnostic and Statistical Manual for Mental Health Disorders, Version IV (DSM-IV) (American Psychiatric Association 1994, 2000)

The manual, published by the American Psychiatric Association, covers all mental health disorders for both children and adults and provides standard criteria for the classification of mental disorders. The last major revision was the fourth edition ("DSM-IV"), published in 1994, and a "text revision" was produced in 2000. The DSM-V is due for publication in 2013.

Edinburgh Postnatal Depression Scale (**EPDS)** (Cox et al. 1987)

This is a 10-item self report scale widely used as a screening tool to identify women likely to be suffering from postnatal depression. Respondents choose one of 4 options relating to sleep disturbance, low energy, guilt, low mood and suicidal ideation. Total scores indicate the likelihood of depression.

Emotional Processing Scale (EPS) (Baker et al. 2010)

This is 25-item, five-factor self-report questionnaire designed to measure emotional processing styles and deficits. Respondents identify on a Likert-type scale ranging from zero to nine how they would respond to statements relating to management of emotions depending on how they have felt over the last week.

General Health Questionnaire, 12-items (GHQ-12) (Goldberg 1972)

The GHQ-12 is a 12-item self-report measure of mental health, which focuses on two major areas – the inability to carry out normal functions and the appearance of new and distressing experiences. Respondents are asked to identify whether they have experienced a particular symptom of behaviour recently and each item is rated on a four-point scale.

Hamilton Rating Scale for Depression (**HAMD)** (Hamilton 1960)

This is a multiple choice screening tool used by clinicians to assess the severity of major depression. Responses to each question are determined by the clinician through patient interview and observation of presenting symptoms.

Holmes and Rahe Social Readjustment Rating Scale (Holmes and Rahe 1967)

Also known as the Holmes and Rahe Stress Scale, it contains a list of 43 stressful items that can contribute to illness. Respondents indicate which items they have experienced in the last 12 months. Values that have been attributed to each item are added together to give a total score which indicates the riss of illness developing.

Hospital Anxiety and Depression Scale (**HADS)** (Zigmond and Snaith 1983)

The HADS is a fourteen item scale used by clinicians to determine the levels of anxiety and depression in people with physical health problems. Seven of the items relate to anxiety and seven relate to depression.

International Classification of Diseases, 10th revision (**ICD-10)** (World Health Organisation)

This is the 10th revision of the medical classification list compiled by the World Health Organization (WHO) for the coding of diseases and their associated signs and symptoms. Specific codes have been produced for pregnancy, childbirth and the puerperium and for certain conditions originating in the postnatal period.

Levels of Emotional Awareness Scale (**LEAS)** (Lane et al. 1990)

The LEAS is a 12-item self report scale that measures individual differences in the complexity of emotional awareness among adults.

Maternal Postpartum Attachment Scale (**MPAS)** (Condon and Corkingdale 1998)

This was developed from the Maternal Antenatal Attachment Scale (MAAS) (Condon 1993). It contains 19 items relating to core maternal attachment and 17 items relating to anxiety about the child and focuses on the subjective

experiences of the parents in relation to their infant during the first year of life. Three categories -'acceptance and tolerance', 'pleasure in proximity' and 'competence as a parent' indicate the level of attachment.

Medical Outcomes Survey Short Form 36, Version 2 (MOS SF-36) (Ware and Sherbourne 1992)

The SF-36 is a measure of health status. It contains 36 questions and scores can be grouped into eight factors of functional health and wellbeing as well as two summary measures of physical and mental health.

National Institute for Health and Clinical Excellence (**NICE)**

NICE provides guidance to support healthcare professionals, local authorities, charities and those with a responsibility for commissioning healthcare, public health or social care services to ensure that care provision is of the best possible quality and offers best value for money. The organisation provides evidence-based guidance on the most effective ways to prevent, diagnose and treat disease and ill-health, reducing inequalities and variation.

Neonatal Behaviour Assessment Scale (**NBAS)** (Brazelton and Nugent 1995)

The scale helps to provide an understanding of newborn behaviour and is suitable for examining newborns and infants up to two months old. It contains 28 behavioural and 18 reflex items to assess and looks at the baby's capabilities in several developmental areas: autonomic, motor, state regulation and social-interactive systems. Results produce an understanding of how infants integrate these areas as they adapt to their new environment.

Observer Alexithymia Scale (**OAS)** (Havilland et al. 2000)

This is a 33-item, five-factor measure that can be used by patients' acquaintances and relatives to define features of alexithymia.

Patient Health Questionnaire (**PHQ-9)** (Kroenke and Spitzer 2002)

This is a 9-item scale for identifying depression. It is based directly on the DSM-IV (see above), and has two components – the assessment of symptoms and functional impairment enabling a tentative diagnosis of depression and a severity score that will help to select and monitor treatment.

Perceived Stress Scale (PSS) (Cohen et al. 1983)

This is one of the most widely used psychological instruments for measuring the degree to which situations in life are appraised as stressful. Questions, which are about feelings and thoughts during the last month, assess how unpredictable, uncontrollable and overloaded respondents find their lives.

Pitt Depression Scale (Pitt 1968)

This is a 24-item questionnaire designed to screen for maternal anxiety and depression before and after childbirth. Respondents are asked to indicate from a list of symptoms whether each one was present over the past few days or on the current day of the questionnaire

Postpartum Depression Screening Scale (**PDSS)** (Beck and Gable 2000)

This is a 35-item Likert-type self-response scale consisting of 7 domains, each of which contains 5 items, which identifies women who are at high risk for postpartum depression. Scores fall into one of three ranges: normal adjustment, significant symptoms of postpartum depression, positive screen for major postpartum depression.

Pregnancy Depression Scale (**PDS)** (Altshuler et al 2008)

Tool developed in the USA to screen for depression during pregnancy, developed from the 28-item Hamilton Rating Scale for Depression (see above).

Repression Sensitization Scale (Byrne et al. 1963)

This scale measures the personality traits and coping strategies found in respondents' reactions to threats, such as avoidance, dissociation and denial.

Rosenberg Self-Esteem Scale (**RSE)** (Rosenberg 1989)

This is a ten-item Likert scale widely used in social-science research which measures state self-esteem by asking the respondents to reflect on their current feelings. Items are answered on a four point scale - from strongly agree to strongly disagree.

Scottish Intercollegiate Guidelines Network (SIGN)

SIGN develops evidence based clinical practice guidelines for the National Health Service (NHS) in Scotland. SIGN guidelines are developed from systematic reviews of the literature on specific topics with the aim of standardising practice to improve patient outcomes.

State-Trait Anxiety Inventory (Spielberger et al. 1970)

This tool measures two types of anxiety, state and trait, as well as overall anxiety levels, in adults. The Inventory is divided into two parts, each of which contains 20 questions with four possible answers. Responses help to distinguish feelings of anxiety from those of depression and they differentiate between temporary or emotional state anxiety and long-term personality trait anxiety.

Toronto Alexithymia Scale (**TAS-20)** (Bagby et al.1994)

The TAS, a 20-item self-report scale, is one of the most widely used instruments for assessing alexithymia in both research and clinical practice. Items are rated using a 5-point Likert scale ranging from strongly disagree to strongly agree. Scores yield three factors, difficulty identifying feelings, difficulty describing feelings, and externally oriented thinking.

UK National Screening Committee (NSC)

The NSC provides evidence and guidance to the NHS in the four UK countries about all aspects of screening. It assesses the evidence for programmes against a set of internationally recognised criteria covering the condition, the test, the treatment options and the effectiveness and acceptability of the screening programme.